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STRICTURE OF THE URETHRA:

ITS COMPLICATIONS AND EFFECTS.

STRICTURE OF THE URETHRA:

ITS COMPLICATIONS AND EFFECTS.

A

PRACTICAL TREATISE

ON THE

NATURE AND TREATMENT OF THOSE AFFECTIONS

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BY ROBERT WADE, F.R.C.S.,

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PREFACE.

THIS Treatise has no pretensions to either Microscopical or Historical distinction. Considering that the end and aim of all our attainments as Surgeons should be the relief or cure of disease, my endeavour has been to produce a thoroughly practical work. For this reason, I have dwelt principally upon the results of my experience of the Pathology and Treatment of Urethral Affections, and in my reference to the writings of others I have restricted myself to really practical points.

I have quoted the opinions of the most distinguished French authors on Urethral Surgery at greater length than those of the English, because they are less generally known.

Of late years, the chief object of the more advanced practitioners has been the practice and advocacy of a "conservative" mode of treatment in surgical diseases. The result has undoubtedly been a triumph to "conservative surgery." Singularly enough, however, the diseases of the urethra, some of the most important of the maladies to which mankind is subject, have been an exception to this rule. Operations have been performed and vaunted abroad, even by men of eminence, which have served to throw a false halo around the proceedings. But it cannot be denied that the brilliancy of these operations has been dimmed by the results, and that the natural effect must be a return to those unostentatious, but really more efficient modes of treatment which have stood the test of long experience.

The practice of cutting, or "slitting up" of strictures, has certainly great temptations for its adoption, as, should no untoward circumstances occur, the *immediate* relief obtained is often so great that the patient can scarcely find words sufficient to express his

gratitude to the operator, who has apparently so quickly effected a cure of his disease. Generally, however, the return of his old symptoms will convince the sufferer that there is no "royal road" by which the desired end can be attained in the treatment of stricture, any more than in other matters of science. Division of strictures, when milder measures have failed, may undoubtedly be occasionally useful in assisting the process of dilatation; but to regard this method as a cure of the disease is contrary to the experience of those who are best informed upon the subject. It is well known that internal division of strictures was fully tested in England by Guthrie and Stafford, who latterly acknowledged its hazards, and were so much disappointed with the little permanent relief which it afforded that they were ultimately induced to abandon the practice, except in cases of emergency.

It is but justice to myself to state, that my opinions regarding the treatment of Urethral Stricture would not have been so confidently advanced had they not been carefully tested. For the last twenty-five years, no inconsiderable portion of my time has been devoted to the study of Urethral disease. During that period I have had ample opportunities, both in public and private practice, of witnessing the effects of the various methods of treating these affections.

In this work my great object has been to enforce the adoption of the principles and practice of "conservative surgery" in the treatment of Urethral Stricture. Should the views which I have advanced induce others to hesitate before they resort to the more hazardous modes of treatment, which have lately been too prevalent, it is to be hoped that my labours in this branch of the profession may prove useful in saving many patients from the risk incurred by submitting them to operations, not unfrequently fatal, and which, I feel convinced, are seldom required.

My best acknowledgments are due to Mr. Joseph Maclise for his kindness in allowing me to transfer to my pages some of the admirable illustrations of the pathological anatomy of the urethra and bladder, contained in his excellent work on "Surgical Anatomy."

68, Dean Street, Soho Square, W.,
January 1, 1860.

CONTENTS.

CHAPTER I.

ON STRICTURE OF THE URETHRA.

Definition of Stricture—Division into permanent and spasmodic—Pathology and varieties of Stricture—Reybard's views—Objections to their general applicability—Length and numbers of Strictures—Seat of Stricture—Effects of Stricture on other parts of the Urethra—Morbid sensibility of Strictures—Illustrations of the different kinds of Stricture .. Pages 1—17

CHAPTER II.

CAUSES OF STRICTURE.

Division into predisposing and exciting—Opinions of different writers—Congenital malformations .. .. Pages 18—22

CHAPTER III.

VARIETIES OF STRICTURE.

Dilatable Stricture—Simple chronic Stricture—Impermeable Stricture—Irritable Stricture—Inflammatory Stricture—Elastic Stricture—Spasmodic Stricture—Traumatic Stricture—Stricture from ulceration of the external urethral orifice—Hæmorrhagic Strictures .. .. .. Pages 23—35

CHAPTER IV.

SYMPTOMS OF STRICTURE.

Influence on the stream of urine—Gleety discharge—Perineal pain and its causes—Necessity for early examination by instruments—Rigors and their cause—Irritability of the rectum—Increased secretion and incontinence of urine in connexion with Stricture—Involuntary seminal emissions—Diagnosis—Affections of the urethral canal resembling Stricture. Pages 36—44

CHAPTER V.

ON THE INTRODUCTION OF INSTRUMENTS IN THE TREATMENT OF URETHRAL AFFECTIONS.

Mode of passing the catheter, &c.—Phillips' and Civiale's views thereon—Method of fixing a catheter in the bladder .. .. .. Pages 45—50

CHAPTER VI.

ANATOMY OF THE URETHRA.

Division of the canal into the spongy membranous and prostatic portions—Length of Urethra—Diameters of the canal—Structure of the Urethra—Mr. Adams' description—Hancock's and Kölliker's views of the muscularity of the Urethra—Wilson's and Guthrie's muscles—The compressor urethræ, acceleratores urinæ, and levator ani muscles .. Pages 51—60

CHAPTER VII.

TREATMENT OF STRICTURES OF THE URETHRA.

Necessity of gentleness in the use of instruments—Civiale's observations—Dilatation—Bougies, catheters, and sounds—Temporary dilatation—Special dilatation—Dr. Arnott's dilator—Dilators of Messrs. T. Wakley and Holt—Sir B. Brodie's mode of dilatation in difficult cases—Permanent dilatation by retention of the catheter or bougie—Dupuytren's method—Cases in which this plan of dilatation is most useful—Civiale's observations—Leroy d'Etiolles' remarks—Amussat's treatment by forcible injections—Illustrations of the dilators of Messrs. Wakley and Holt Pages 61—91

CHAPTER VIII.

AIDS TO DILATATION—CAUSTIC.

The use of caustics in Stricture not a novel mode of treatment—Opinions of Mr. Hunter, Sir Everard Home, Mr. B. Cooper, Mr. Guthrie and others, on the efficacy of nitrate of silver in Stricture—Mr. Whately on the use of caustic potash in cases of Stricture—His mode of applying the remedy—Author's method—Effects of the caustic potash in Stricture—Cases in which that agent has proved most useful—Difference of the Author's views and those of Mr. Whately with regard to the employment of caustic potash Superiority of the effects of the potash to those of the lunar caustic in Stricture Professor Simpson on the effects of the caustic potash in affections of the cervix uteri—Dr. Gross on the efficacy of this caustic in Stricture—Nitrate of silver the caustic employed by the French surgeons Illustration of the portes caustiques used by the Author—Professor Lizars' opinion of the efficacy of caustic potash in Stricture—Statistics of forty-eight cases of Stricture of an aggravated character treated by the caustic alkali .. .. Pages 92—155

CHAPTER IX.

ON THE OPERATIONS FOR THE RELIEF OF RETENTION OF URINE, AND FOR THE DIVISION OF STRICTURES.

Puncture of the bladder—Different methods—By the perineum—Through the rectum—Above the pubes—Mr. Cock's experience respecting the puncture through the rectum—Sir B. Brodie's opinion of the different methods—Puncture above the pubes preferred by Mr. Abernethy—Dr. Gross's statistics of puncture of the bladder—The operation seldom necessary—Opening the Urethra—Operation first performed by Sir A. Cooper—Much practised by the late Mr. Guthrie—Recommended by Mr. Simon in cases of retention of urine .. .. Pages 156—162

CHAPTER X.

INTERNAL DIVISION OF STRICTURES—DIVISION BY THE LANCETTED CATHETER—EXCISION OF STRICTURES.

Mr. Stafford's mode of treatment by the lancetted catheter—Mr. Guthrie's experience of this method—Disadvantages of the operation—Civiale's experience of internal section—Reybard's method of performing urethrotomy—Leroy d'Etiolles' opinion of Reybard's operation—Excision of Strictures—This method practised principally by Phillips and Leroy d'Etiolles—Description of the cases in which it is recommended by the former—Illustrations of instruments for effecting internal division of Strictures .. .. Pages 163—189

CHAPTER XI.

EXTERNAL DIVISION OF STRICTURES—PERINEAL SECTION.

Mode of performing the operation in impermeable Stricture—Hazards of the procedure—Its unsatisfactory results—Professor Syme's method of perineal section—Dangers of the operation—Remarks by Professors Miller and Fergusson on the proceeding—Unsatisfactory results of perineal section—Civiale's remarks on Syme's operation—Cases in which that proceeding proved fatal .. .. Pages 190—215

CHAPTER XII.

SURGICAL FEVER.

Professor Simpson on this disease—"Causes of death after surgical operations and injuries"—"What is the nature of the malady which accompanies or gives rise to these secondary lesions?"—"Signs of the secondary lesions"—"Treatment of surgical fever" .. Pages 216—228

CHAPTER XIII.

TREATMENT OF THE DIFFERENT KINDS OF STRICTURE.

Dilatable Stricture—Simple chronic Stricture—Impermeable Stricture—Inflammatory Stricture—Elastic Stricture—Spasmodic Stricture—Traumatic Stricture—Stricture from ulceration of the external urethral orifice .. .. Pages 229—243

CHAPTER XIV.

RETENTION OF URINE.

Occasional urgency of the case—Mode of employing the catheter—The use of enemata, purgatives, warm baths, and opiates—Causes of retention of urine—The treatment to be adapted to the nature of the case.

Pages 247—254

CHAPTER XV.

EXTRAVASATION OF URINE.

Causes of extravasation—Necessity for immediate interference—Sir B. Brodie's remarks on the effects of extravasation—Treatment—Remarkable case of extravasation .. .. Pages 255—262

CHAPTER XVI.

ABSCESSES AND FISTULÆ.

Suppuration and its causes—Varieties of urinary abscess—Sir B. Brodie's mode of treating one form of urinary abscess—Urinary fistulæ—Treatment of fistulæ—Mr. Hamilton's method by compression—Urethroplastic operations .. .. Pages 263—270

CHAPTER XVII.

CHRONIC INFLAMMATION OF THE MUCOUS MEMBRANE OF THE BLADDER.

Pathology—Appearances of the mucous membrane after death—Symptoms—Treatment—Various internal remedies—Injections .. Pages 271—276

CHAPTER XVIII.

SACCULATED BLADDER.

Causes of sacculation—Situation of the pouches—Symptoms—Cases described by the late Mr. Shaw and Mr. Guthrie; also by Sir B. Brodie and Dr. Wilmot—Treatment .. .. Pages 277—281

CHAPTER XIX.

BAR-LIKE RIDGE, OR CHRONIC THICKENING OF THE NECK OF THE BLADDER.

First described by Mr. Guthrie—Civiale's remarks on the disease—Symptoms described by Mr. Guthrie—Treatment—Case .. .. Pages 282—290

CHAPTER XX.

INFLAMMATION OF THE PROSTATE GLAND—PROSTATITIS.

Not a frequent effect of Stricture—Its nature and treatment—Sir B. Brodie on—Abscess of prostrate—Dr. Gross on .. .. .. Pages 291—295

CHAPTER XXI.

HYPERTROPHY, OR CHRONIC ENLARGEMENT OF THE PROSTATE GLAND.

Pathology of—Symptoms and causes of—Its complication with Stricture—Sir E. Home on—Treatment—Sir B. Brodie and Mr. Guthrie on—Sir B. Brodie on the management of the catheter in retention from—Opinions of eminent surgeons with regard to the kind and form of prostatic catheters which are likely to prove most useful—Illustration of prostatic catheters .. .. Pages 296—310

CHAPTER XXII.

IRRITABILITY OF THE BLADDER—SPASM OF THE BLADDER—CALCULUS IN THE BLADDER.

Irritability of the Bladder—A common effect of Stricture—Dr. Prout's remarks on—Treatment—Spasm of the Bladder—Its causes and treatment—Stone in the Bladder—Complication with Stricture—Symptoms—Treatment—Civiale's remarks on the latter .. .. .. Pages 311—316

CHAPTER XXIII.

SPERMATORRHŒA—INVOLUNTARY SEMINAL EMISSIONS.

As a complication of urethral Stricture—Causes of the emissions—Mucous discharges after defecation—Treatment of spermatorrhœa—Constitutional—Treatment—Different kinds of tonics—General invigorating means—Local treatment—Nitrate of silver—Use of metallic sounds—Illustration of an instrument for applying a solution of caustic—Counter-irritants.

Pages 317—322

CHAPTER XXIV.

GLEET.

Causes—Often difficult to cure—Remedies—General and local—Treatment when complicated with Stricture .. .. Pages 323—326

CHAPTER XXV.

HÆMORRHAGE FROM THE URETHRA.

Causes—Predisposition to hæmorrhage—Treatment—Effect of pressure—Internal remedies—Hæmorrhage from the bladder—Vesical injections—Hæmorrhage from prostatic disease .. .. Pages 327—330

CHAPTER XXVI.

FALSE PASSAGES.

How formed—Situation—Effects—Causes, immediate and accidental—Parts of the urethral canal in which false passages are most frequently made—Their diagnosis—Civiale's observations on—Illustration of false passages .. .. Pages 331—336

CHAPTER XXVII.

PROSTATIC AND URETHRAL CALCULI.

Formation—Composition—Symptoms—Complication with Stricture—Treatment—Remarks of Sir B. Brodie on—Retention of urine from urethral calculi—Illustration of urethral calculi .. .. .. Pages 337—340

CHAPTER XXVIII.

IRRITABILITY OF THE URETHRA—ULCERS ON THE GLANS AND PREPUCE.

Various causes of irritability of the Urethra—Sympathetic and local—Symptoms—Diagnosis—Treatment—Ulcers of the glans and prepuce—Causes—Treatment .. .. Pages 341—344

CHAPTER XXIX.

INFLAMMATION OF THE TESTES—ORCHITIS.

Causes—Symptoms—Acute and chronic stage—Treatment .. Pages 345—346

CHAPTER XXX.

CHORDEE—HYPERTROPHY OF THE PENIS.

Chordee—Its connexion with gonorrhœa—Causes—Mr. Guthrie on—Treatment—Hypertrophy of the penis .. .. Pages 347—348

CHAPTER XXXI.

ON THE LIABILITY OF STRICTURE PATIENTS TO A RECURRENCE OF THEIR DISEASE.

Causes—Necessity of continuing the use of instruments after dilatation of the Stricture—Dupuytren's remarks on—Sir B. Brodie's remarks on Pages 349—352

CONCLUDING REMARKS.

General summary—Observations upon the various modes of treatment employed .. .. Pages 353—354

STRICTURE OF THE URETHRA.

CHAPTER I.

ON STRICTURE OF THE URETHRA.

GENERAL DEFINITION—PATHOLOGY—SEAT OF THE DISEASE—EFFECTS OF STRICTURE ON OTHER PORTIONS OF THE URETHRA—MORBID SENSIBILITY OF STRICTURES.

The term "stricture," in surgical language, signifies a morbid obstruction in some of the ducts or canals of the human body; either transient, the result of irregular muscular contraction, or of a more or less permanent character, from some alteration of structure in the part affected.

The male urethra is peculiarly liable to both kinds of obstruction, especially the latter, known as organic or permanent, the former as spasmodic, stricture.

Urethral stricture is rarely observed in women, being almost exclusively a disease of men; a peculiarity which is satisfactorily explained by the canal in the latter being long, narrow, and complicated in its functions and organizations; whilst in the former, it is nearly straight, wide, and short, possessing but little complication in its structure.

In permanent strictures, various degrees of condensation of the lining membrane of the urethra and its subjacent textures are usually observed at the seat of obstruction, their effect being to impair more or less the healthy elasticity of the canal.

From the peculiarities of their pathological appearances, strictures have received various significant appellations. A common form of stricture consists of a narrow whitish band, encircling the canal, compared by Mr. Hunter to a thread tied round the urethra. The white band sometimes takes an oblique direction; or it may present a somewhat crescentic appearance, extending across the

inferior portion of the canal, and to which the term "bridle stricture" has been more particularly applied. In some instances a flat circular band extends half an inch or more along the urethra, called by Sir A. Cooper the "ribbon stricture." In some cases, of very rare occurrence, the greater portion of the urethra has been contracted.

Amussat admits but four species of organic strictures:—"The bridle obstructions, which consist of a thickening, often very slight, of one or more points of the mucous membrane (resulting from previous inflammation), which loses its elasticity. If in the early stage of this stricture the affected person should die of some other disease, and the urethra be afterwards examined, some small white filliform lines are observed, particularly on its inferior portion, presenting but little or no projection to the eye, but which become evident when the nail or sound is passed along the urethra from behind the diseased part forwards. There is another kind of this species of stricture much more projecting, in which the thickening of the mucous membrane is greater. Sometimes these bridle strictures seem to be formed by the cicatrix of an ulcer, and it is in the navicular fossa that it is mostly observed. The mucous membrane, instead of being white, has a red, injected appearance, and the subjacent cellular tissue is sometimes diseased. 2nd. The valvular strictures, which are nothing more than these bridles (*brides*), which occupy the whole circumference of the urethra. In this latter kind, as the area of the canal has lost much of its capacity, the urine, finding a greater resistance, pushes forcibly forward this circular bridle, and thus forms a true valve, a diaphragm, which is traversed by the urethral opening. The valvular strictures are perhaps the most common; the older they are the more contracted is the passage for the urine; they are rarely more than a line, or a line and a half, in thickness. 3rd. Strictures from chronic swelling of the mucous membrane, which occasionally involves the submucous tissue. Amussat relates one case of this kind (that of an old man), in which the mucous membrane was observed very red, presenting a remarkable state of turgescence, the canal being retracted to the extent of twelve to fifteen lines; the urethra behind was much dilated, as were also the lacunæ. This species occurs mostly in old men, who have been subject to one or more attacks of gonorrhœa, who have been in the habit for a long time of using bougies, more or less irritating, for the relief of an habitual discharge. When the submucous tissue is

affected, the cure becomes more difficult. 4th. The callous strictures, which include the various hard and nodous obstructions which form in the submucous and spongy tissues. On *post-mortem* examination, the induration is observed to be seated in the cellular, submucous, and fibrous tissues, the spongy tissue being often involved in the disease, its cells having disappeared and become transformed into a white substance, sometimes involving the neighbouring structures, having the hardness and consistence of cartilage."—*Leçons du Dr. Amussat, sur les Rétrécissements du Canal de l'Urètre, &c.* 1832.

Civiale divides the organic lesions constituting urethral strictures into—1. Bridles (*brides*). 2. Excrescences, carnosities, fungosities, and vegetations. 3. Thickening, induration, and callosities.

Civiale thinks that ulceration is a more frequent cause of stricture than has generally been supposed.

Whatever difference of opinion may exist as to the precise nature of the morbid deposit forming urethral strictures, it is generally agreed that most of these affections originate in inflammation, more or less protracted, commonly commencing in the mucous membrane of the canal, and often extending to its subjacent tissues.

Mr. Hunter, however, Sir Everard Home, Mr. Wilson, and some few others, who contended for the muscularity of the urethra, imagined that strictures of that canal were principally caused by a wrong action of some of its surrounding muscular fibres.

Morbid anatomy undoubtedly affords evidence of the occurrence of inflammation in most cases of permanent stricture of the urethra, and in the various stages of inflammation we have a satisfactory explanation of the pathological changes observed in these affections.

The opinion most generally entertained is, that stricture of the urethra commonly has its origin in an exudation of plastic lymph, the result of inflammation in some part or parts of the mucous membrane of the canal, or its subjacent cellular tissue, by which these structures become firmly united, organized, and consolidated at the seat of disease.

The inflammation may eventually involve the spongy portion at the seat of disease, closing its cells by lymphatic effusion, and often producing so much consolidation as to form a tumour of a gristly hardness, which can be more or less distinctly felt by the finger externally. From the puckered appearance of the mucous membrane which has been observed in many instances, there is

good reason to conclude that ulceration occasionally produces stricture.

Strictures vary much in consistence, being in their early stage usually soft, elastic, and yielding, but becoming in their progress more dense, often attaining a fibro-cartilaginous hardness. This fibroid transformation, which possesses a more or less powerful contractile cicatrix-like property, does not, I believe, *usually* take place until strictures have existed for some considerable length of time, although I have occasionally found this fibroid character in cases in which only a few months had elapsed from the occurrence of a first gonorrhœa, and when no symptom of urethral irritation had previously existed.

A stricture which I have found of not unfrequent occurrence, consists in a firm, dense, rather narrow band, very tough, and more or less elastic, completely encircling the urethra. This stricture, on the introduction of a metallic sound, communicates to the hand a hard, grating sensation, as though the instrument passed through cartilage. This hard elastic ring in its exact extent is most distinctly felt when the sound is withdrawn, as its point escapes from the grasp of the stricture. There are sometimes two of these obstructions, their locality being usually at the commencement of the bulb, and its junction with the membranous portion of the canal. This species of urethral obstruction may be properly described as the fibro-cartilaginous-ring stricture.

With one exception, the views of the most distinguished French authors on urethral stricture will be found to differ but little, with regard to its pathology, from those of the English. That exception is M. Reybard, whose views both as to the pathology and treatment of stricture, differ materially from those commonly entertained. The treatise of M. Reybard, published in 1857, and which bears the stamp of great talent and originality, is stated to be nearly a literal reproduction of the *Mémoire* presented by him to the *Concours*, at the sitting of the Imperial Academy of Medicine in Paris, in August, 1852; and which gained the Argenteuil prize of 12,000 francs. To use the words of his reporter, M. Robert, "Reybard, with all pathologists, considers blennorrhagia as the most common cause of strictures of the urethra; but he goes beyond the received ideas when interpreting the part played by these phlegmasia in their production. According to him, all strictures due to this cause are constituted in all epochs of their evolution of a tissue anormal, or of transformation, and not of engorgement, of thicken-

ing, from induration of the urethral parietes, as is generally understood."

That M. Reybard's views may be rightly comprehended, I shall here quote a few passages from his work, relating to the manner of formation of the tissue of strictures:—"During the inflammatory state, and principally towards its decline, the organizable liquids effused in the texture of the inflamed tissues, coagulate, condense, and undergo vital elaboration, called organization; vessels are formed, and the new product enjoys henceforth a life of its own. At the same time, the tissues which have served as a substratum to its generating blastema, being compressed, choked by its presence, and more or less deprived of the elements of their nutrition, become affected by a special interstitial absorption; they atrophy rapidly, and end by disappearing completely, so as to leave no trace of their primitive organization. The new tissue which has usurped the place of the primitive tissues, preserves nothing of their structure or properties."

"The consistence, the solidity, the tenacity of the new tissue, will be found generally greater than those of the urethral parietes. Thus one often sees that attempts at dilatation by forced catheterism, after the method of Mayor, instead of acting on the diseased tissues, will rather break and tear in preference to those of the healthy portion of the urethral canal."

M. Reybard, when noticing the tendency of strictures to return, observes that chance at first, and, on the other hand, various experiments, have conducted him to the following fact, "that the tissue of strictures not only possesses a slow retractility, progressive by interstitial absorption, in the manner of cicatrices, but also a retractility, rapid, almost instantaneous, like membranes and yellow elastic fibres. Let it be understood, nevertheless, that in assigning to the generating tissue of stricture, the properties of inodular and yellow elastic tissue, I do not pretend to assimulate it to one or the other, and still less to make of it, in an anatomical point of view, a mixed tissue, which participates at once in their double nature."

Retractility, Reybard observes, "is the property, in virtue of which the tissue of organic strictures becomes shortened. Like cicatricial tissue, it narrows the canal in a slow, incessant, and progressive manner. The partisans of dilatation believe that this retractile property is not an inherent and essential quality in strictures, and that it can be paralysed, destroyed. Such is

not my opinion. I regard this tissue of strictures as indefinitely retractile. The retractility of organic strictures is very variable. It appears in an inverse degree to their extensibility; weak in recent strictures with still dilatable parietes, it becomes more and more energetic as they become older, from which it may be concluded that the difficulty of dilatation increases with time."

Elasticity Reybard considers as "that property of the tissue of strictures, by virtue of which, after having been elongated and distended by sounds, it quickly recovers more or less its previous state, as soon as the dilatation has ceased. It acts somewhat like a spring or the middle tunic of arteries."

"The elasticity is composed of two distinct phenomena, extension and retraction, which I shall call elastic, to distinguish it from the slow retraction previously described. The elastic extensibility of strictures presents great varieties; it is difficult to appreciate their causes. I have many times remarked that the strictured tissue offers less resistance at the commencement of dilatation, than towards its close. At other times, I have observed, that this tissue was only extensible to a certain degree, beyond which dilatation became painful, and even impossible. It is the extensibility of this tissue, to which is to be attributed the extreme difficulty of cutting it with scarificators with short blades."

"Elastic retractility consists in the closure of the openings of organic strictures which have been enlarged by dilatation. It is under its influence that strictures return after having been treated by dilatation. This property exerts itself in two different modes: the first consists in a quick recontraction, by virtue of which the opening of the obstacle which has just been enlarged recloses, and loses immediately a more or less considerable part of the elongation to which it has been subjected. The second mode of retraction exerts itself, on the contrary, more closely and insensibly."

Most surgeons of much experience in the treatment of urethral stricture, will scarcely, I think, admit the general applicability of M. Reybard's views with regard to the pathology of the disease. It appears to me evident, that this distinguished surgeon has derived his pathological prototype of stricture from one particular form of the disease, in which elasticity and retractility are so strongly marked, as to render the ordinary mode of treatment by dilatation very unsatisfactory.

I believe, with other pathologists, that the peculiar transformation of the strictured portion of the urethra into a structure of new

formation, closely resembling the tissue of cicatrices, is by no means, as M. Reybard supposes, an *essential* character of urethral stricture.

My own experience induces me to believe, that, although the transformation of strictures into a cicatricial-like tissue may *sometimes* occur in their early stage, it does not *usually* take place, until a considerable length of time after their formation.

I have good reason to conclude that, so far from this fibroid transformation being an essential element of the disease, many urethral strictures of several years' duration consist merely of an inflammatory condensation of the part affected.

At all events, in many cases in which symptoms of stricture have existed for several years, the bougie has afforded me no evidence of the cicatrix-like transformation. I may add that the satisfactory results of the use of the bougie in these cases is, to my mind, evidence enough that the new tissue which M. Reybard considers as characteristic of stricture could not then have been formed. Every surgeon conversant with the treatment of strictured urethra well knows the difficulty in effecting satisfactory dilatation of the truly elastic-india-rubber-like stricture.

I should not have dwelt so much on M. Reybard's pathological views, were it not for the hazardous practice which they have led him to adopt and recommend, as the only satisfactory method of treating urethral obstruction. There appears to me no sufficient reason to believe that there is any peculiar transformation of tissue in urethral stricture, which is not the effect of ordinary inflammation.

In the valuable Lectures on Surgical Pathology by Mr. Paget, the various changes of structure resulting from inflammation are so graphically described, and are so applicable to the formation and subsequent changes of urethral stricture, that I am tempted to quote a few passages from that admirable work.

Mr. Paget considers that the process of contraction always associated with the development of granulations is not merely the result of some vital power of contraction, as has been generally supposed, but "as the necessary mechanical effect of the change of form and construction that the parts undergo." The same change, he observes, "ensues in the organization of inflammatory products, as, *e. g.*, in false membranes, indurations, thickenings of parts, and the like consequences of the exudation and the organization of lymph."

"Now, in all these cases, the form of the cell, while developing itself into a filament, is so changed that it will occupy less space. The whole mass of the developing cells becomes more closely packed, and the tissue that they form becomes much drier; with this also there is much diminution of vascularity. Thus there results a considerable decrease of bulk in the new tissue as it develops itself; and this decrease of bulk beginning with the development of the granulation-cells, continues in the scar, and I think sufficiently accounts for the contraction of both, without referring to any vital power."—Pp. 267, 276, vol. i.

"The general natural tendency of organizable lymph produced in inflammation is to form filamentous, *i. e.* fibro-cellular or fibrous tissue; and, secondly, all lymph has some tendency to assume, sooner or later, the characters of the tissue in or near which it is seated, or in place of which it is formed.

"The natural tendency of organizable lymph to the construction of fibro-cellular or connective tissue, such as compose false membranes, or adhesions, and many permanent thickenings and indurations of parts, is shown by the production of this tissue under all varieties of circumstances, and in nearly all parts, even in parts which naturally contain little or none."—P. 356, vol. i.

"As the fibro-cellular and fibrous tissues, formed from inflammatory lymph, become more perfectly organized, they are prone to contract: imitating the contraction already described in granulations and scars."—P. 361, vol. i.

"Elastic tissue is sometimes abundantly formed in the adhesions developed from inflammatory lymph. I have not seen it except as in such as are completely organized, and I think it is in this case, as in the formation of scars, a late production."—P. 362, vol. i.

"The superficial suppuration from inflamed mucous membranes is closely related to that from an ulcerated surface. I think that an inflamed mucous membrane may yield purulent matter, even though it remain covered with an epithelium. I believe this happens in gonorrhœa, and in purulent ophthalmia: the vascular tissues in these affections appear still to have epithelium on them, though, perhaps, it is too thin and immature, and is reduced to a condition analogous to that of the thin and moist glistening epidermis on the inflamed 'weeping leg.' But observations are wanting on this point. The transition to suppuration from an ulcerated surface takes place when the epithelium is wholly removed from a mucous membrane. This constitutes its abrasion or excoriation;

in the next stage, the surface of the membrane is cast off, and this is its ulceration."—P. 393, vol. i.

Strictures have been supposed by some authors to be occasionally formed by caruncles or excrescences. These must, however, be of very rare occurrence, as Mr. Hunter, who had probably examined a greater number of urethras than any other pathologist, in his work on "Venereal Disease," when alluding to these excrescences, observes, "I have, in all my examinations of dead bodies, seen only two, and these were in old strictures, when the urethra had suffered considerably."

Strictures vary in length from a mere line to an inch, or more, in extent. In some few instances, the greater portion of the spongy body has been contracted. The short, bridle-like strictures may either occupy the entire circumference or only a portion of the diameter of the canal. In the former, the aperture of the stricture is centrical; in the latter, it may be found either laterally, superiorly, or inferiorly. Some writers restrict the appellation of bridle stricture to that form of obstruction which consists of a small narrow band stretched across the urethra.

As a general rule, the longest and toughest strictures are those seated in the straight portion of the urethra, whilst those at the curve are shorter and more yielding. In a clinical lecture, Mr. Syme lately made the following remark:—"As far as I know, I never met with a tight stricture behind the scrotum along with an extreme degree of contraction anterior to it." In long strictures the contracted portion of the urethra is frequently more or less tortuous, from the irregularity of the diseased tissue, which has bossy projections, of greater or less hardness. In many cases, however, no such projections exist, the obstructed passage being tolerably straight. It is not usual to meet with more than two strictures in the same urethra, although, occasionally, there may be three or four, and in rare instances, even more: Hunter had seen six, Lallemande seven, and Colot eight. In a great many cases, probably in the majority, only one stricture exists, its locality being mostly at the bulb.

Regarding the most common seat of stricture, there is much difference of opinion, which might naturally be expected, as each observer would be very likely to deduce conclusions upon this point from his individual experience. This difference is most remarkable with regard to the membranous portion, which by some authors is considered to be more frequently constricted than any other part of

the urethral canal; whilst others consider it as seldom the seat of this disease, which, they assert, is confined exclusively to the spongy tissue. The generality of observers, however, agree that the most common seat of stricture is the bulbous portion of the urethra.

According to Sir Everard Home and Sir B. Brodie, the anterior part of the membranous portion immediately behind the bulb, is more frequently affected with stricture than other parts of the canal. Civiale and Amussat assert, that stricture is most common in the spongy portion of the bulb.

According to Reybard, three-fourths of all strictures are at the bulbo-membranous region. It is stated in my work on Stricture, published in 1853, that in 130 specimens of urethral stricture which I examined, the bulbous and commencement of the membranous portions were contracted in 103, in eighty-seven of which number no other part of the urethra was affected. In the remaining sixteen, there also existed strictures anterior to the bulb. In twenty-seven of the 130 cases, the obstructions were confined to the spongy portion of the canal, anterior to the bulb. This statement was drawn up from an examination of the preparations of urethral stricture in the Museums of the Royal College of Surgeons, St. Bartholomew's, Guy's, and St. Thomas's Hospitals. The locality of the strictures was given precisely as they were catalogued. The *Lancet* for May 12th, 1849, contains an abstract of the result of Mr. H. Smith's investigations on the seat of stricture, laid before the Westminster Medical Society. I shall quote the following passage:—"Of ninety-eight specimens of stricture he (Mr. Smith) had found that the disease was seated in the membranous part of the urethra only in twenty-one instances, whilst in seventy-seven the stricture was found to be in front of the triangular ligament, and in the majority of these the obstruction was seated either in the substance of the bulbous portion of the canal, or a little way in front of it."

In his work on Urethral Stricture, Mr. Henry Smith gives the result of his examination of eighty-five specimens of stricture, as follows:—"It will be seen that the seat of stricture is found in the membranous portion in eighteen cases, less than one-fourth of the whole, and in all these but four; the stricture involves the bulb as well. In seventeen instances, the stricture is situated in some part of the straight or spongy portion, from the orifice to within an inch of the bulb, whilst in fifty of the specimens the disease is situated either in the bulb itself or just in front of it. In only one instance

is the stricture at the prostatic portion, and that is in the shape of a broad membranous expansion."—*Stricture of the Urethra. By Henry Smith, F.R.C.S.* 1857.

Although there is no part of the urethra in which stricture may not possibly occur, that it rarely affects its prostatic portion is evident from the very few cases of the kind which have been recorded. A distinct contraction of this part of the urethra without prostatic disease, however, was observed by the late Mr. Crosse, and one or two other surgeons.

That more or less of the membranous part of the urethra is occasionally the seat of stricture, must be admitted, from instances of the kind which have been recorded by competent observers, as well as from the undeniable evidence of this species of contraction deduced from the examination of some few specimens in museums. A drawing illustrative of stricture of the entire membranous portion of the urethra is given by Professor Lizars, in his "Practical Observations on the Treatment of Stricture of the Urethra and Fistula in Perineo." Leroy D'Etiolles, in his work on "Strictures of the Urethra, &c.," has the following passage:—"In the collection commenced by Dupuytrien, at the Hôtel Dieu, I have remarked one very long stricture, situated at the bulb, and comprising a great part of the membranous portion."

Dr. Druitt, in the seventh edition of his "Surgeon's Vade-Mecum," gives a drawing from a preparation in King's College Museum, of a stricture in the membranous portion of the urethra, just in front of the verumontinum.

From its proximity to the pubic arch, this part of the urethra is sometimes involved in the contraction resulting from injuries of the canal, caused by its forcible compression against the symphisis pubis.

In a paper in the "London Medico-Chirurgical Transactions," vol. xii., p. 461, by the late Mr. Shaw, are the following remarks:—"I have not, in more than a hundred dissections which I have made of diseases of the urethra, seen a stricture or narrowing of the canal posterior to the ligament of the bulb; nor have I been able to find one example of stricture beyond this part among those preserved in the College Museum."

After the trustworthy evidence relating to this subject by competent observers, we must conclude that the part of the urethra surrounded by the corpus spongiosum, more especially its bulbous expansion, is the usual seat of stricture, which is only occasionally

observed in the membranous, and very rarely in the prostatic, portion of the canal.

The anatomical structure of the membranous portion of the male urethra, from its close resemblance to the female urethral canal, has been commonly assigned as the principal reason of its comparative freedom from stricture.

The discrepancy which exists amongst writers on urethral obstructions, with regard to the liability of the membranous portion of the urethra to stricture, may in some degree be explained from the fact, that the point of junction between that part and the bulb is remarkably subject to contraction.

This last kind of obstruction has often been undoubtedly described as a stricture in the membranous portion of the urethra; but the substitution of the word "at," instead of "in," will afford a satisfactory, and probably the true explanation of many of the mistakes which have occurred in the descriptions of different authors relating to this point.

It is also very probable, that some of the misconception with regard to the membranous portion of the urethra being so frequently the seat of stricture, has been the result of conclusions deduced from the introduction of instruments in the living body, and when measuring the distance of the contraction from the external urethral orifice, by not making due allowance for the more or less elongation of the canal which usually occurs in that operation.

It is right to state, that the observations of Mr. Shaw, on the rarity of the occurrence of urethral stricture posterior to the ligament of the bulb, were published in 1823; a fact, which, I believe, he was the first to point out. To that excellent anatomist, therefore, must be ascribed the merit of having proved by his dissections, the rarity of stricture at the membranous portion of the urethral canal.

The urethra at the seat of stricture has been compared to a double funnel; the funnel-like appearance is, however, observed principally behind the obstruction, which part of the canal is in many cases more or less dilated, especially when the constriction is considerable. The mucous membrane immediately anterior to the stricture is often corrugated; and within, but chiefly behind the obstruction, there exists a state of congestion or inflammation, with augmented sensibility, evidenced from the greater pain experienced on the introduction of a bougie at that part of the urethral passage than in other portions of the tube.

Although the urethral canal in front of the stricture is generally healthy, the anterior portion, or face of the stricture itself, is often its most irritable part; very slight pressure of the bougie causing in some instances considerable pain, and occasionally a little bleeding. Old hard strictures, however, have in general but little disposition to hæmorrhage, and are remarkably deficient in sensibility. In such cases increased vascularity and excited sensibility are exceptions to the general rule.

When a stricture causes much impediment to the flow of urine, the dilatation behind the constricted part is in some cases considerable. A remarkable instance is related by Sir B. Brodie of this kind of dilatation, which, when the patient voided his urine, formed a fluctuating tumour in the perineum of the size of a small orange. These dilatations originate from the increased efforts of the bladder to propel its contents through the urethral obstruction; they vary in size from a slight increase of the normal diameter of the canal to the degree of enlargement mentioned by Sir B. Brodie. These pouches, when of considerable size, may be regarded as accessory bladders acting as reservoirs for the accumulation of urine. The site of these urethral dilatations is most commonly the membranous and prostatic portions of the canal, but they may occur in any part of its course. In some few instances of obstruction at the anterior part of the urethra, the entire canal behind has been dilated to twice or thrice its natural size. The urethral canal anterior to its obstructed portion is commonly of its natural calibre, except in some bad cases of stricture in which the greater part of the urine passes through fistulous openings, when that part of the passage has been more or less contracted. Mr. Shaw, in his observations in the "Medico-Chirurgical Transactions" to which I have previously referred, observes, "In almost every instance where a narrow stricture has existed for some time in any part of the urethra anterior to the ligament of the bulb, I have found the membranous and prostatic portions dilated to three or four times their natural size." The mucous membrane posterior to the stricture may be more or less thickened, having sometimes an irregular tuberculated aspect, apparently from depositions of lymph which have become organized. In this morbid condition of the lining membrane ulceration is likely to occur, and the canal may probably be ruptured by the powerful expulsive efforts of the bladder, causing extravasation of urine, unless, as in many such cases, it fortunately happens that the cellular tissue in the vicinity

of the stricture has become previously so much condensed by effused lymph as to form a protective barrier around the breach, by which extravasation is prevented.

A calculus may lodge in the urethra behind the strictured part, and cause retention of urine. Sometimes a pouch is formed at the inferior portion of the canal by a calculous concretion, which, by its gradual enlargement from additional urinary deposits, often acquires a considerable magnitude.

Such a concretion may, however, be retained in the urethra for some length of time, with little increase of size; but should urethral or vesical inflammation occur, it may become rapidly enlarged by a deposition of the phosphates, which commonly then takes place.

In some instances, the urethral tube behind the stricture becomes encrusted with lymph and calcareous matter. In the more aggravated forms of stricture some deviations from its usual course are observed in the urethra, constituting various degrees of deformity, the obstructed portions of the canal often presenting an irregular, serpentine, or zigzag appearance; and, in many instances, fistulous openings, sometimes several in number, may add to this disfigurement.

Mr. Shaw observes that "the ducts of the prostate, which are naturally very small, are always more or less enlarged when there has been a stricture, or a long-continued irritation of the canal." Mr. Shaw mentions a case, "in which a complete labyrinth is formed by the enlarged ducts and by membranous bands, both of which are evidently the consequence of the narrow stricture behind the glands."—*From the "Medico-Chirurgical Transactions," before quoted.*

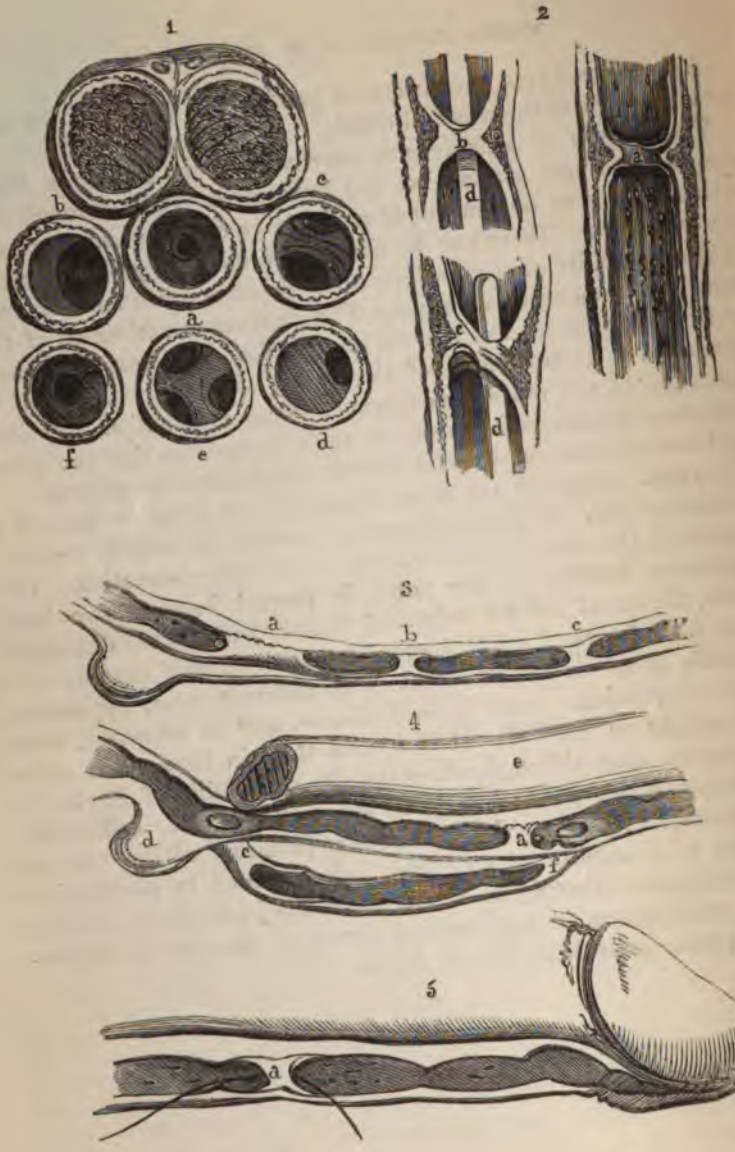
In some cases the ducts of the prostate have become so much dilated as to admit the point of a good-sized bougie, and the gland itself has been occasionally, although not very frequently, diseased, being either much hardened and enlarged, or disorganized by abscesses. In a man of extremely intemperate habits, who died from rupture of the urethra at the age of forty, having suffered more or less for half his life from urethral stricture, I found the prostate much enlarged, of a dark chocolate colour, studded with patches of lymph, and so soft as to be broken up by very slight pressure. The serious effects often produced by stricture on structures posterior, or external, to the urethral canal, will be hereafter noticed.

MORBID SENSIBILITY OF STRICTURES.

As a general rule, the strictured portion will be found the most sensitive part of the urethral canal.

The degree of sensitiveness may vary from merely a slight shrinking of the patient, as the instrument passes through the stricture, to such an amount of suffering as to cause him to scream out with pain. There can be little doubt that the great difference in the sensibility of urethral strictures depends much more on constitutional than on local causes. The extreme sensitiveness of the urethral nerves at the seat of obstruction, has been by many attributed to inflammation of the tissues of the stricture, and to ulceration of the mucous membrane. This explanation, plausible as it may appear, is, however, set aside by the fact that the principal seat of inflammation and ulceration is behind the stricture.

Reybard attributes the sensitiveness of the front or face of a stricture—"1st, To the compression exerted by sounds on that portion of the mucous membrane close to the obstruction. The membrane, healthy in this point, is pressed between two hard bodies, the sound and the strictured tissues 2nd. To the distension of the fibroid tissue." The degree of sensitiveness of the face of a stricture, however, varies so much in different cases, apparently under very similar states of local disease, and is, moreover, often less marked in hard fibroid strictures than in those of a softer consistence, that, although admitting the plausibility of Reybard's reasoning on this point, it does not appear to me to be sufficiently satisfactory. I believe that the true explanation of the varying degrees of sensibility of strictures, will be found in peculiarities of constitution reflecting their impress on the local disease, causing more sensitiveness in the urethral nerves at the seat of obstruction in some individuals than in others.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"*Figures* 1 *and* 2.—In these figures are presented seven forms of organic strictures occurring in different parts of the urethra. In *a*, Fig. 1, the mucous membrane is thrown into a sharp circular fold, in the centre of which the canal appears much contracted. A section of this stricture appears in *b*, Fig. 2. In *b*, Fig. 1, the canal is contracted literally by a prominent fold of the mucous membrane at the opposite side. In *c*, Fig. 1, an organized band of lymph is stretched across the canal; this stricture is seen in section *c*, Fig. 2. In *e*, Fig. 1, a stellate band of organized lymph, attached by pedicles to three sides of the urethra, divides the canal into three passages. In *d*, Fig. 1, the canal is seen to be much contracted towards the left side by a crescentic fold of the lining membrane projecting from the right. In *f*, the canal appears contracted by a circular membrane, perforated in the centre; a section of which is seen at *a*, Fig. 2. The form of the organic stricture varies, therefore, according to the three following circumstances:—1st. When lymph becomes effused within the canal upon the surface of the lining mucous membrane, and contracts adhesions across the canal. 2nd. When lymph is effused external to the lining membrane, and projects this inwards, thereby narrowing the diameter of the canal. 3rd. When the outer and inner walls of a part of the urethra are involved in the effused organizable matter, and, on contracting towards each other, encroach at the same time upon the area of the canal. This latter state presents the form which is known as the old callous tough stricture, extending, in many instances, for an inch or more along the canal. In cases where the urethra becomes obstructed by tough bands of substance, *c e*, which cross the canal directly, the points of flexible catheters, especially if these be of slender shape, are apt to be bent upon the resisting part; and on pressure being continued, the operator may be led to suppose that the instrument traverses the stricture, while it is most probably perforating the wall of the urethra. But in those cases where the diameter of the canal is circularly contracted, the stricture generally presents a conical depression in front, which, receiving the point of the instrument, allows this to enter the central passage unerringly. A stricture formed by a crescentic septum, such as is seen in *b d*, Fig. 1, offers a more effectual obstacle to the passage of a catheter than the circular septum, like *a f*.

"*Figure* 3.—In this there are seen three separate strictures, *a*, *b*, *c*, situated in the urethra anterior to the bulb. In some cases there are many more strictures (even to the number of six or seven), situated in various parts of the urethra; and it is observed that when one stricture exists, other slight tightnesses in different parts of the canal frequently attend it.—(Hunter.) When several strictures occur in various parts of the urethra, they may occasion as much difficulty in passing an instrument as if the whole canal between the extreme constrictions were uniformly narrowed.

"*Figure* 4.—In this the canal is constricted at the point *a*, midway between the bulb and glans. A false passage has been made under the urethra by an instrument which passed out of the canal at the point *f*, anterior to the stricture *a*, and re-entered the canal at the point *c*, anterior to the bulb. When a false passage of this kind happens to be made, it will become a permanent outlet for the urine so long as the stricture remains. For it can be of no avail that we avoid re-opening the anterior perforation by the catheter, so long as the urine, prevented from flowing by the natural canal, enters the posterior perforation. Measures should be at once taken to remove the stricture.

"*Figure* 5.—The stricture *a* appears midway between the bulb and glans, the area of the passage through the stricture being sufficient only to admit a bristle to pass. It would seem almost impossible to pass a catheter through a stricture so close as this, unless by a laceration of the part, combined with dilatation."

CHAPTER II.

CAUSES OF STRICTURE.

These have been properly divided into the remote or predisposing, and into the more immediate or exciting.

With regard to the former, it may be as well to state at once the well-known fact, that urethral stricture rarely commences in infancy or in old age, the usual time of its occurrence being the middle period of life—from puberty to thirty-five or forty years of age, whilst the sexual organs are in their highest state of energy.

A residence in warm climates has been generally considered as predisposing to urethral stricture, from their inhabitants being more addicted to venereal gratification than those of temperate climes. A residence in large towns must also be regarded as a predisposing cause of this disease, from the facilities which it affords for the indulgence in promiscuous sexual intercourse.

Amongst the predisposing causes of stricture, probably a more influential one than has generally been suspected, must be included an hereditary constitutional tendency to the disease. Several instances of the kind have occurred in my practice, but none so remarkable as one which some few years ago came under my notice. In that case, the gentleman who became my patient was one of five brothers, and was affected with urethral obstruction at eleven years of age; his next brother when nine years old, and the remaining three from thirteen to fifteen. In each case it was necessary to pass bougies for their relief. The father of these gentlemen was also a great sufferer from stricture.

Congenital stricture of the urethra appears to be extremely rare.

Before describing the more immediate or exciting causes of stricture, it may be as well to allude to what must be familiar to

the most common observers; viz. that there are certain states of constitution, either natural or acquired, which especially predispose to urethral contraction, after exposure to the exciting causes of the disease. This is evident; for out of a hundred cases of gonorrhœa, how few will be succeeded by the formation of stricture. Persons of a sanguine, excitable temperament, will naturally be more liable to stricture than those of a colder nature, from the greater disposition of the former to venereal gratification.

With regard to the exciting causes of stricture, it has been previously remarked, that whatever produces urethral inflammation may lead to the formation of stricture. The exciting causes which chiefly tend to the production of stricture, are as follows:— Firstly, protracted gonorrhœa; secondly, continued chronic urethral inflammation in persons of an irritable habit, the exciting cause being frequently the practice of self-abuse; thirdly, the continued discharge of unhealthy urine containing the oxalate of lime, the lithates or phosphates in excess; fourthly, mechanical injuries, external and internal, the latter often resulting from the unskilful use of instruments; fifthly, calculi, or other causes producing inflammation of the kidneys, ureters, or bladder, which subsequently extends to the urethra; sixthly, tumours or other substances, such as calculous concretions encroaching upon the urethral tube. With respect to the last-mentioned cause it is proper to notice, that the term "stricture" is usually understood as applicable only to obstructions which have their origin within the urethra itself. Civiale considers that after blennorrhagia, the most frequent of all the causes productive of stricture, is the unskilful employment of the curative means advised for the removal of the obstruction.

The *modus operandi* of inflammation in the production of stricture has been so fully discussed, when considering the pathology of the latter, as to require but very few additional remarks upon the subject. The previous existence of ulceration certainly appears to be the most reasonable explanation of the bridle strictures, and, in some instances, the evidence of its occurrence has been indisputable. Civiale remarks that we are now returning to the opinion of the ancients, who attributed strictures to ulceration of the urethral surface, and to the cicatrix which follows. Chancres are sometimes productive of very troublesome stricture at, or very close to, the external urethral orifice. Some pathologists, amongst whom are Ducamp and Laennec, consider that stricture most commonly originates from the agglutination of false membranes upon the free

surface of the mucous lining of the urethra. Mr. Hancock has met with two or three cases in which strictures were caused by a false membrane deposited upon the free surface of the urethral canal, and thinks that permanent obstructions from this cause are of frequent occurrence. The result of my own observation, from many careful *post-mortem* examinations, is, that such strictures are an exception to the usual method of their formation; that of inflammatory condensation of the mucous and subjacent urethral tissues. As, however, the calibre of the canal is equally obstructed in either case, the precise mode in which the obstruction is formed is of little practical importance, which is most fortunate, as it would be impossible during life to distinguish the one from the other.

As it is admitted that inflammation is commonly the cause of stricture, the peculiarities of structure and complicated functions of the male urethra, with its great liability to gonorrhœa, afford a sufficient explanation of the frequency of the occurrence of obstruction in that canal, and the rarity of contraction from morbid thickening in other mucous channels. The use of astringent injections has been very commonly included amongst the causes of stricture. Is it an ascertained fact, however, that urethral contraction is more likely to succeed gonorrhœa in cases in which injections have been used than when they have not? That stricture may originate from the injudicious employment of injections in the acute stage of gonorrhœa, is, indeed, highly probable; but such a practice is apt to prove injurious in so many respects, that but few surgeons are likely to adopt it.

Although it is a practice at the present time not often had recourse to, I formerly saw a sufficient number of cases of highly contracted strictures in the anterior portion of the urethra, following the use of strong injections of nitrate of silver, to convince me that the latter are sometimes the cause of urethral contraction in an aggravated form. It was a common practice, some years ago, to use these injections of the strength of from [illegible] to twenty grains of the nitrate to an ounce of water, [illegible] early stage of gonorrhœa.

The above-mentioned [illegible] of injections which—[illegible] chronic stage of gonorrh[illegible] ing over the inflam[illegible] d —will, in [illegible] re-

venting the disease being protracted in the form of gleet. Ricord has truly remarked, that it is the inflammation of the urethral canal, and not the injections, which cause stricture. It has been too frequently noticed by competent observers, to admit of much doubt on the subject, that it is in cases in which the chronic gleety stage of gonorrhœa is more than ordinarily persistent, that stricture is most likely to occur. It may surely, then, with good reason be inferred that injections, when properly used, are preventative rather than a cause of urethral stricture. Scrofula has commonly been considered as an influential cause of stricture. It certainly has not appeared to me that strumous persons affected with gonorrhœa are more predisposed than others to urethral contraction. The opinions of those who regard scrofula as an influential cause of stricture, have been supported principally by their having noticed that the scrofulous is precisely the state of constitution which particularly predisposes to the prolonged existence of chronic inflammation. This is undoubtedly true, and might appear somewhat inconsistent with the opinion which I have expressed, that scrofulous persons are not more liable to strictured urethra than others, were it not for the well-known fact of there being less tendency to the effusion, and more especially to the subsequent organization of lymph in scrofulous than in healthy subjects.

I have good reason to believe, that the pernicious practice of self-abuse is a much more frequent cause of stricture than is generally supposed. In several instances of the kind, in which there had been no sexual intercourse, the strictures which were at the bulb proved more than usually refractory, from the extreme morbid sensitiveness of the entire urethral canal.

In some instances, the urethra has been so sensitive, that even the most gentle attempts to introduce a soft bougie have been exceedingly painful, causing great trembling, and such extreme general nervous excitement, as to closely resemble a paroxysm of hysteria.

Urethral obstructions dependent on congenital malformations are occasionally met with. These consist of a thin membranous valve, extending across the lower part of the urethra, at, or very near, the external orifice of the canal. These valvular obstructions being easily recognised from their proximity to the meatus, can be divided with facility by a narrow probe-pointed bistoury.

A stricture at the external urethral orifice, except from chancrous ulceration, is usually congenital.

The few cases of stricture of the female urethra which are usually situated at, or very close to, the external meatus, appear to have been caused by some injury sustained during child-birth.

CHAPTER III.

VARIETIES OF STRICTURE.

STRICTURES of the urethra, for practical purposes, may be classed under the following heads.—1. The Dilatable Stricture. 2. The Simple Chronic Stricture. 3. The Impermeable Stricture. 4. The Irritable Stricture. 5. The Inflammatory Stricture. 6. The Elastic Stricture. 7. The Spasmodic Stricture. 8. The Traumatic Stricture. 9. The Cicatricial Stricture, from ulceration at the external urethral orifice.

Of the first species, it will be sufficient to state that the term *dilatable stricture* has been commonly used to designate an obstruction possessing but little irritability, in which the healthy elasticity of the urethral canal is only slightly impaired, so that its dilatation is soon effected, and the disease completely removed.

2. *The Simple Chronic Stricture.*—In this stricture the urethral contraction is more persistent than in the dilatable—some alteration of structure having taken place in the urethral parietes at the seat of disease, which have become condensed from the organization of effused lymph. It must consequently be expected that the cure of such a stricture will not be so promptly effected as in the first species, the time requisite for the absorption or removal of the thickened tissues in the second necessarily causing the curative process to be more protracted.

3. *The Impermeable Stricture.*—When a stricture is impervious to instruments, it is called impassable or impermeable. The obstruction may be so complete as to entirely prevent the passage of urine through the urethra, in which case, for the preservation of life, either nature or art must effect an outlet for its escape. The obstruction, however, in these strictures is seldom so complete as to prevent the urine trickling through them, and passing partly, if not entirely, by its natural channel, either in drops, or in a very small thread-like stream.

4. *The Irritable Stricture.*—This stricture is highly sensitive, the introduction of a bougie causing unusually severe pain, and is generally, but not always, disposed to bleed when an instrument is passed through it. The urine when passing over a stricture of this kind frequently causes a sensation of heat or scalding, sometimes so painful that the patient dreads the act of micturition. Rigors are apt to occur occasionally, especially after the introduction of instruments. Irritable strictures are usually observed either in persons whose digestive organs are unhealthy, in those whose general health has been impaired by residence in warm climates, or in such as have been accustomed to much indulgence in the pleasures of the table, by which a high degree of excitability of the nervous system has been produced. In the poorer classes of society, the irritability is most frequently brought on by the excessive use of ardent spirits. An irritable stricture, if under the influence of muscular action, is predisposed to spasm; and, if in a part of the urethra not surrounded by muscles, the irritation caused by the pressure of an instrument often produces such a distension of the vessels of the corpus spongiosum around the obstruction, and of the lining membrane at the seat of disease, as frequently, for a short time, to obstruct entirely the passage of the urine.

I believe that the irritability of a stricture depends more frequently upon constitutional peculiarity than on inflammation of the lining membrane of the urethra. That peculiar temperament in which the nervous system is morbidly sensitive, somewhat similar to the hysteric, is the one in which strictures, when they occur, are most likely to become irritable. It will readily be conceived that in such constitutions, the nerves, at the seat of disease, may be extraordinarily sensitive on pressure, or any irritation, independently of inflammation.

5. *The Inflammatory Stricture.*—By this term is understood a stricture caused by acute inflammation of some part of the urethra, most frequently from the extension of gonorrhœal inflammation to the posterior part of the urinary canal, inducing a swollen state of its lining membrane, generally with more or less spasm of the surrounding muscles. The same phenomena may, however, be produced by other causes, as external or internal injury.

6. *The Elastic Stricture.*—There are some strictures which, from their remarkable resiliency, are sure to recontract with more or less rapidity if left to themselves, although a full-sized instrument may have been passed through them into the bladder. It is to this kind

of obstruction, distinguished by its strong contractile tendency, to which the terms "elastic" and "resilient" have been particularly applied. This is the stricture which more than any other has often proved rebellious to the ordinary means of treatment in the hands of the ablest surgeons, obstinately resisting every effort to accomplish its dilatation, and the one which, even after free division by the knife, has often reappeared in a more aggravated form. The explanation of the remarkable tendency to recontraction of this form of obstruction will be found in the description of the pathological transformation of urethral stricture.

7. *The Spasmodic Stricture.*—This term "spasmodic" should, I think, be restricted to an obstruction from involuntary contraction of the muscles surrounding the bulbous, and especially the membranous portion of the urethra, the latter being that part of the canal in which spasm most frequently occurs.

The spasmodic contraction may be caused either by a morbid state of the urethra itself, or it may be merely sympathetic, from irritation of some neighbouring part. The sympathy which exists between the bladder and rectum is well known, and sufficiently explains how any irritation of the latter may cause more or less disposition to spasm at the membranous portion of the urethra; an occurrence familiar to surgeons, as occasionally resulting from the application of a ligature to hæmorrhoidal tumours.

Any irritation at the neck, or bas-fond of the bladder, is likely to produce a disposition to spasmodic contraction at the membranous portion of the urethra,—an event of common occurrence in cases of vesical calculus or of enlargement of the prostate.

In some persons strong mental emotions have been productive of so much spasm of the urethral muscles as to cause retention of urine.

Of the causes of spasmodic stricture which act directly upon the membranous and bulbous portions of the urethra, the irritation of the urethral mucous membrane, caused by highly acid or alkaline urine in gouty irritable constitutions, are amongst the most frequent.

Many surgeons of great experience have denied the existence of a purely spasmodic stricture; and according to the best authorities on the subject, it should be regarded as of rather rare occurrence. Mr. Guthrie observes: "The only case of pure spasmodic action which has come under my observation, occurred in a gentleman who has come to my house twice in the course of several years, declaring he could not make his water, and desiring to have the

catheter passed, which was each time done without the least difficulty. The first time he came he was quite aware of his situation, said it arose from anxiety of mind relating to family affairs, and that the passage of an instrument would immediately and effectually relieve him. If there was any obstacle (and I was by no means certain of there being any beyond a hesitation), it was at the commencement of the membranous part of the urethra, and arising, I suppose, from a spasmodic contraction of the compressor urethræ of Mr. Wilson. As this gentleman suffered no kind of inconvenience at any other time, I am induced to believe that there was no particular irritation of the urethra, and that it was, as the cause is unknown, accidentally spasmodic."—*On the Anatomy and Diseases of the Neck of the Bladder and of the Urethra*, p. 87. *By G. J. Guthrie, F.R.S., &c.* 1834.

Sir B. Brodie has made the following remarks in relation to this subject:—"Spasmodic stricture is always situated in the membranous portion of the urethra, where the canal is surrounded by a sort of sphincter muscle of no inconsiderable size, connected by a small double tendon to the arch of the pubes. A particular description of this muscle has been given by the late Mr. Wilson, in the first volume of the 'Medico-Chirurgical Transactions;' and it seems not unreasonable to suppose that it is the real seat of these spasmodic affections. Instances are not wanting of persons who have been for a considerable time liable to occasional attacks of retention of urine from spasmodic stricture, although, in the intermediate periods, there was no perceptible diminution of the stream of urine; and hence we are justified in the conclusion, that a spasmodic stricture may exist independently of actual organic disease. At the same time it must be acknowledged, that the existence of a purely spasmodic stricture is of rare occurrence." —*Lectures on the Diseases of the Urinary Organs*, p. 6. *By Sir B. Brodie, Bart, F.R.S., &c.*

By many surgeons it has been supposed, that spasmodic stricture may occur in any part of the urethral canal. This supposition appears to have arisen principally from the circumstance of instruments having been grasped by obstructions situated anterior to the bulb. An irregular or excessive action of some of the muscular fibres described by Hancock and Kölliker, which have been traced by the former traversing the whole course of the urethra, has, since their discovery, been regarded as sufficiently explanatory of the occurrence of spasm in the anterior portion of the canal.

These muscular fibres are, however, so extremely minute, that I can scarcely imagine them capable of possessing the power to grasp a bougie with the force which is occasionally experienced in obstructions anterior to the acceleratores urinæ muscles. It is certainly no uncommon occurrence in irritable urethræ, for instruments to be obstructed in different portions of the canal anterior to the perineal muscles, when there appears to be no thickening, or disease that can be detected at the seat of obstruction. But in such cases it will, I believe, be found that there is more or less of morbid sensibility of the urethral mucous membrane at the point where a bougie meets with obstruction; and that it is very probable the afflux of blood to the sensitive portion of the tube may be, to some extent, the cause which prevents the advance of the instrument. This is the cause which has been most commonly assigned for the occurrence in question. It appears to me, however, that the obstruction to, or grasping of, an instrument under the circumstances just mentioned, is caused principally by the unyielding nature of the elastic tissue of the urethra, which participates in the irritability of the lining membrane of the canal.

I do not think that the exceedingly minute muscular fibres surrounding the urethra are capable of exerting any more powerful effect upon an instrument than that suction-like, or clinging action which is so frequently experienced on withdrawing a bougie from an irritable urethra, when it may naturally be supposed these tiny muscles are peculiarly predisposed to contraction; a very different sensation, however, to that of the firm grasp of a spasmodic stricture at the curved portion of the canal. That a morbid sensibility, often of no slight degree, exists at the spot where a bougie is obstructed in the cases in question, is evident from the increased pain caused by the instrument at that part of the canal, and from the relief usually afforded by a gentle application of caustic to the lining membrane at the seat of contraction.

Mr. Hancock has related an instance of this kind of "spasmodic" contraction, at about three quarters of an inch from the urethral orifice. I will quote his own observations upon this case:—"At first, the pain produced by any attempt to pass the spasmodic contraction was so excessive, that the patient roared with agony, and there was no managing him, but by applying caustic once or twice; this has been allayed, and we now get on very well."

The cases in which instruments are grasped anterior to the perineal muscles, when no thickening can be detected at the obstructed point, are usually observed in persons of high nervous excitability, or in such as are affected with a mild form of congestive urethritis, in which, on inspection of the urethral orifice, an increased redness, and a slightly swollen state of the mucous membrane, will be found; and there will very probably be sufficient vitiated secretion to agglutinate the lips of the urethra, which will be evident on examining the meatus urinarius in the morning, before the act of micturition.

Every surgeon familiar with the pathology and treatment of urethral stricture must have observed, that whatever part of the urethra may be the seat of obstruction, the stream of urine will be more contracted on some days than on others; also, that an instrument which is held but lightly at one time, will probably, on its next introduction, be very firmly griped. These phenomena have been often indiscriminately explained by the presumed occurrence of spasm, and such strictures have been denominated mixed—partly permanent and partly spasmodic. When, however, in these cases, instruments are grasped by obstructions anterior to the bulb, the sensation is very different to the firm vice-like clutch so frequently felt in strictures at the membranous portion of the urethra. The persistent tightness with which an instrument is held by a hard fibroid stricture is very different to the clutching intermitting action of the perineal muscles, which have their periods of more or less relaxation, if not of complete intermission.

From an attentive consideration of the subject, I cannot but think that the term "spasmodic" should be limited to obstructions in that portion of the urethra which is embraced by the perineal muscles.

It has been previously observed, that spasmodic stricture may be merely sympathetic, produced by irritation or inflammation of neighbouring parts, and more especially of the rectum. When not dependent either on disturbed function, or organic change of other structures, there will generally be sufficient evidence of the existence of inflammation; or, at all events, of some morbid sensibility at the seat of contraction, evidenced by an increase of pain experienced on the passage of an instrument through the affected part. That inflammation is very often productive of these spasmodic obstructions is proved by their liability to terminate in permanent stricture. The cause which is more especially influential in excit-

ing these muscular contractions, appears to be irritation of the urine passing over the inflamed and morbidly sensitive mucous membrane at the seat of spasm. My own observation entirely coincides with that of those who believe that a purely spasmodic stricture, unless from sympathy of irritation of neighbouring parts, is of rare occurrence. There is no difficulty in accounting for spasm in the inflamed state of the lining membrane of the urethra; but when healthy, it cannot be supposed that the urine will prove so highly irritating as to excite spasmodic action of the canal, sufficiently powerful at times to resist, for many hours, the introduction of the catheter.

That spasm of Wilson and Guthrie's muscles at the membranous portion of the urethra may sometimes be excited by long-continued efforts to resist the desire to void the urine, is highly probable. It is also very probable, that some peculiar derangement of the nervous system, of the nature of which we are unacquainted, may occasionally interrupt that sympathetic "consent," described by Sir C. Bell as existing between the muscles surrounding the urethra, and those concerned in the contraction of the bladder, by which the former relax, whilst the latter contract; and which was compared by that physiologist to the well-known connexion between flexors and extensors.

The great majority of cases described as spasmodic stricture, there can be little doubt, result from some degree of inflammation of the mucous membrane at the posterior portion of the urethra; and that it is the irritation from the contact of the urine with the inflamed membrane which excites the surrounding muscles to action, and interferes with their necessary relaxation on the contraction of the detrusor.

These inflammatory spasmodic strictures are most frequently observed in persons with a disordered state of their digestive organs, or who indulge in some excess, the exciting cause of the spasm being often highly acid urine. These spasmodic obstructions frequently originate from the sudden suppression of gonorrhœal discharge, when the urethral inflammation, from cold or other causes, rapidly extends to the bulbous and membranous portions of the canal, and excites so much spasmodic action of the surrounding muscles as to produce complete retention of urine.

In some cases, however, instead of the gonorrhœal inflammation extending from the anterior to the posterior part of the urethra,

after amputation of the penis. When the urethra is divided transversely, the two ends of the incision are notably drawn apart. These facts are of great importance for the understanding of what passes after these kinds of divisions; they explain why the cicatrix constantly presents, in these cases, the two following characters:—1st. Of being narrower than that portion of the canal which it replaces is when in a state of distension. 2nd. Of presenting a certain extent in an antero-posterior direction.

"In effect, the cicatrix is narrow because it is produced in a canal habitually closed, flattened, and which exceptionally acquires only the amplitude of which it is susceptible. It presents a notable extent, from the separation of the two ends of the wound, and by its occupying their intervening space. Later, the progressive retraction of the cicatricial tissue, if it diminishes the extent of the canal from before backwards, is especially to narrow more and more the calibre of the tube. This effect is observed after amputation of the penis, in the difficulty of keeping the canal open, and in the necessity, in many cases, after this operation, of enlarging the canal, by the use of the bistoury, and in the importance of having recourse to the frequent introduction of sounds to prevent a return of the contraction."

Reybard agrees with other writers in considering that the traumatic strictures, produced by the solutions of continuity of the urethra caused by blows or falls on the perineum, are the most intractable of all urethral obstructions. "These contusions," he remarks, "produce most frequently a swelling, an infiltration of blood in the urethral parietes, causing two orders of phenomena perfectly distinct:—1st. A persistent organic stricture consecutive to the inflammation or suppuration of the infiltrated tissues; 2nd. A stricture of another kind, an immediate obstruction, resulting from the mechanical pushing of the mucous urethral membrane towards the axis of the canal. The first appears to have been completely neglected, to judge by what has been written on these contusions of the perineum."

"In the first place, let us remark, that blows too weak to bruise the perineal structures act with singular violence on the urethral canal, notwithstanding its depth. That portion of the urethra in the vicinity of the pubis is particularly exposed to injury, from its liability to be bruised against the bone; then, its structure, its erectile tissue, composed of cells, all communicating together, and its two sheaths, internal and external; the first thin,

soft, and extensible; the second, thick, rigid, and inextensible. All liquid accumulated in the areolar bed presses at once on these two membranes, and tends to separate the one from the other; but the external resists, whilst the internal, yielding to the expansion of the liquid, causes a projection in the urethral canal, obstructing or even obliterating its cavity.

"The spongy tissue is more particularly torn in any violent bruises of the perineal region; it is from the injury of this body that is formed the bloody intra-parietal tumour, which obliterates mechanically the urethral tube. It must be recollected that the cells of the spongy body are in a very different state in the living than in the dead, as in life they are gorged with blood; and it is their fulness and turgescence which explains their greater liability to injury from external violence than the cellular structure of the perineum.

"In these cases of rupture of the spongy cells, an irregular cavity is formed, more or less spacious, according to the number of cells destroyed; the extravasated blood produces a tumour, which is bounded before and behind by the cells which remain entire—from without, by the inextensible fibrous membrane; from within, by the thin mucous membrane which is pushed forward by the effused blood. The intra-parietal tumour thus formed causes in a certain extent of the canal an obstruction more or less complete. This traumatic stricture ought not to be confounded with that which results from compression of the canal by a tumour formed external to the urethral parietes. Both may proceed from the same cause, and equally oppose the passage of the urine; but the difference in the seat of the tumour in the two cases leads to a great difference in a therapeutic point of view. No author, hitherto, that I know of, has thought of making this distinction. They have been generally content to admit that the retention of urine, consecutive to contusions of the perineum, was due to the compression exerted on the canal by a sanguineous tumour developed in the perineal tissues outside of the urethral parietes, which it pushes towards the interior of the canal.

"In the most simple case, where the lesion is confined to the spongy body, and there are only a few cells destroyed, with sometimes an absence of any appreciable tumour, the injured person experiences neither pain nor difficulty of micturition. But such a case is rare: most frequently the disorder is less limited, the pain at the moment of the shock is sharp, a bloody tumour forms imme-

diately in the track of the canal; and is distinguishable by the touch, notwithstanding its deep situation. There soon remains only a sensation of weight and distension in the perineum, and the injured person believes himself free from any serious consequences. He is soon, however, aroused from this insidious security, by the desire to pass his urine, which desire soon becomes urgent; and when attempting to relieve himself, the difficulty, and often impossibility of micturition, reveal the existence of a deep-seated disorder, which he had never suspected, and which induces him to apply for surgical assistance. It is the swelling of the urethral canal which causes the frequent desire of micturition and fruitless attempts to satisfy it, as I have more than once observed after urethotomy, when the imperfection of my instruments did not permit of my making a regular section of the parietes of the urethra, and when a clot of blood was retained in the canal or its parietes.

"When a blow on the perineum has been violent, or, when slight, it has acted more directly on the urethra, the membranes enclosing the spongy body are often torn at the same time as its cells. When both are broken, the blood of the spongy body escaping through the openings of its membranes, passes on one side by the urethra, and from the other infiltrates itself into the cellular tissue of the perineum, where it forms a swelling and an ecchymosis more or less considerable. The hæmorrhage by the canal indicates the laceration of the internal membrane; the ecchymosis and the swelling of the perineum announce the rupture of the external tunic. Often, the sanguineous swelling and ecchymosis, after having invaded the sheath of the canal and the perineal tissues, extends to the scrotum and inguinal regions. The contusions, which produce simultaneously the laceration of the spongy body and the two membranes of the urethra, are the most frequent. In these cases, the hæmorrhage from the canal is rarely a serious accident; and it is better in general not to interfere with the discharge, whatever may be its duration. The obstruction of the canal is, in my opinion, the most serious complication of these accidents.

"Another consequence of these contusions with rupture of the mucous membrane is infiltration of urine. The laceration of the internal urethral membrane is irregular and complicated with a bloody tumour. The intra-parietal sanguineous tumour forms a barrier to the course of the urine, and forces this liquid to stagnate, and to

penetrate through the rupture of the mucous membrane into the substance of the urethral parietes, as well as the neighbouring regions."—*Opus cit.*

9. *Stricture from Ulceration of the External Urethral Orifice.*—This is a variety of urethral obstruction which usually occurs from syphilitic ulceration of the meatus, destroying a portion, or the entire circumference, of the glans; the cicatrization of the ulcer causing more or less contraction of the part, which has a strong tendency gradually to increase, until the outlet for the urine may possibly become so minute as to admit with difficulty the introduction of a small probe.

Some strictures so readily bleed, even on the most careful introduction of instruments, that the term hæmorrhagic might, without impropriety, be applied to them. In extreme cases of this character it is not improbable that the lining membrane at the seat of disease is somewhat similar to that villous congestive state of the internal coat of the eyelids, known as granular conjunctiva, or of some kinds of hæmorrhoidal excrescences. In support of such a view, I may observe that the application of caustic potash very soon removes all hæmorrhagic disposition. The inflammatory stricture, as might be expected, is usually much disposed to bleed on pressure by the bougie; as is also the irritable, the lining membrane of the latter being commonly in a state of sub-acute inflammation or congestion. The irritable stricture has not, however, always this hæmorrhagic disposition; for one of the most irritable strictures I ever met with did not at any time bleed on the introduction of an instrument.

CHAPTER IV.

SYMPTOMS OF STRICTURE.

As might be expected, the early signs of stricture are seldom sufficiently marked to attract attention; and the disease has commonly made considerable progress before it is discovered. A slight contraction of the urinary canal, unless in an irritable urethra, will cause but little impediment to the discharge of urine; and a stricture is not often suspected until some difficulty in micturition is experienced. The first symptom that will probably be noticed by a person affected with stricture is, that he experiences some little difficulty in starting the urine; and that, instead of being passed, as formerly, immediately on the contraction of the bladder, more or less effort will be required at the commencement of micturition. He will also find that his urine is not voided in so full a stream as formerly—that instead of being round it is somewhat flattened, the act of micturition occupying a longer time; he will probably next observe the escape of a few drops of urine after that act has been apparently completed. This may be caused from that part of the urethra immediately behind the obstruction becoming dilated, and forming a reservoir for the collection of urine, which is not affected by the contraction of the bladder, but gradually trickles away afterwards through the stricture. The same trickling occurs more frequently when no dilatation exists behind the obstruction, from the greater difficulty with which the last few drops of urine are urged forwards through the contracted passage than is the case with a larger quantity of fluid. As the contraction increases, the stream of urine is either bifurcated, spiral, or scattered, until at length it become exceedingly small and thread-like, at times issuing only by drops. These different appearances all arise from the urethra being incompletely filled by

the urine, which, when it reaches the orifice of the canal in an unequally diffused stream, must necessarily be either divided, or, if entire, very minute or spiral. The bifurcated or forked stream most frequently occurs in obstructions at the posterior or bulbous portion of the urethra. This appearance and its cause are well seen in spasmodic stricture, the forked appearance being observed at the commencement and towards the termination of the act of micturition, when the force and volume of the stream of water is insufficient for the complete distension of the canal, and the urine escapes from the urethral orifice in two separate streamlets, one at the upper, and the other at the lower, end of the meatus. In narrow contractions in the anterior portion of the urethra the urine is usually passed in one small or slightly scattered stream. It is at length found that the necessity of emptying the bladder becomes more frequent during the day, and the patient is probably obliged to rise two or three times in the night for that purpose. When the stricture has become very contracted, the urine is voided with great difficulty, either by drops, or in a thread-like stream, with much straining; and the abdominal muscles are excited to powerful action. The penis frequently becomes much swollen from distension of its blood-vessels, it being in a state of partial erection during micturition. The irritation sometimes extends from the stricture to the rectum, and the patient has often both prolapsus recti and hæmorrhoids added to his miseries.

A gleety discharge is a very common symptom of stricture. This discharge is often but slight, a few yellowish spots being occasionally observed upon the linen. Sometimes the discharge occurs only after coition, and is often so profuse as to resemble a gonorrhœa, for which it is frequently mistaken by the patient. It is usually, however, attended with but little scalding, and ceases spontaneously in the course of a few days. The discharge may be brought on or aggravated by cold or intemperance. Diarrhœa is also an occasional consequence of bad strictures, arising apparently from irritation, extending by sympathy to the mucous membrane of the large intestines. Pains are often felt in the lumbar and inguinal regions, with more or less aching in the perineum. In many cases of permanent stricture this perineal pain extends down to the left thigh. Why it should affect the left oftener than the right, no satisfactory reason has been assigned; but the fact has been noticed by several writers on stricture. Civiale observes, "When the urethra is contracted, the action of micturition is often accompanied

by a laborious sensation, and even by actual pain; and if whilst the urine is flowing the canal be compressed before the stricture, so as to interrupt the course of the stream, the pain increases to such a degree as to become insupportable, its principal seat being in the vicinity of the obstruction." In bad cases, sterility is sometimes induced from obstruction to the seminal fluid; and impotence may result from irritation extending to the prostatic part of the urethra, causing spermatorrhœa. The seminal emission in such cases is often attended with acute pain. The prostate gland, as well as its ducts, sometimes become inflamed and enlarged. The inflammation of the prostate may terminate in suppuration, the abscess sometimes bursting on the introduction of the bougie, as is indicated by a free discharge of pus from the urethra. The sufferings of the patient are often much aggravated by an extension of the urethral inflammation to the neck of the bladder, causing an urgent and almost incessant desire to micturate. From the diminution of the stream of urine being so very gradual and imperceptible, the presence of a stricture is often unsuspected, until some indiscretion of the patient, causing inflammation of the diseased part, increases the urethral obstruction, and induces more or less difficulty in micturition. In aggravated cases, as has been previously stated, a vitiated mucus is secreted from the urethra posterior to the stricture, the whole of the lining membrane of the urinary organs, in some instances, participating in the production of the secretion. This secretion is the effect of irritation and inflammation of the mucous membrane of the urinary organs, and takes place in other diseases of those parts as well as in cases of stricture, especially in vesical calculus, and enlarged prostate.

It is extremely desirable that the existence of a stricture should be ascertained as soon as possible. If a person be subject to a gleety discharge, whether occasional or constant, the urethra should be examined without loss of time. An urethral examination should also be made when the urine is passed more frequently than ordinary; or if pain be felt in the perineum after micturition. Persons with urethral stricture are sometimes subject to occasional attacks of inflammation of the testes. If, therefore, such inflammation occur, and there be no other obvious cause, a bougie should be passed.

It must not be forgotten that the urine may be voided in a very good stream, when a stricture will admit with difficulty the introduction of a middle-sized bougie; and, in some instances, when the contraction is even greater. In such cases, the increased

muscular power acquired by the bladder enables it to overcome, in a great degree, the urethral obstruction. It must also be borne in mind that much depends upon the state of the stricture itself; for if the elasticity of the obstructed portion of the canal be but slightly impaired, it may yield sufficiently to the increased power of the bladder to enable the patient to void his urine in a larger stream than might be supposed from the size of the bougie which can be passed. It is only when a stricture is rigid and unyielding that the size of the stream of urine can be depended upon as affording correct information of the extent of obstruction which exists. It should be recollected that the muscular power of the bladder is greater during youth and the vigour of manhood than in old age, so that with the same degree of urethral contraction we may expect the urine to be passed more freely in the former than in the latter period. Although, therefore, a patient when young, or in the prime of life, may void his urine in a good-sized stream, if he be longer than usual in the act, his urethra should be examined as soon as practicable.

Rigors, except from the introduction of instruments, are not commonly experienced in this country by those affected with stricture; but in warm climates, from the greater irritability of the nervous system, the constitutional sympathy with the local disease is often indicated by paroxysms of intermittent fever. In some peculiarly irritable constitutions, however, rigors are occasionally observed, even in this country, as symptomatic of stricture, and the disease has been mistaken for ague, the urethral affection having been entirely overlooked. In some persons the constitution so readily sympathises with urethral irritation, that rigors occur from the introduction of instruments. These rigors, when severe, are followed by increased heat of skin, and more or less perspiration. Rigors also occur when an abscess has formed from irritation of the urethra, or after extravasation of urine.

When a stricture has become rigid and narrow, the difficulty of micturition is often very great; the bladder is irritable, usually much contracted, and incapable of containing more than three or four ounces of urine. In aggravated cases the urine is passed every hour, or oftener, during the day, either by drops, or in a thread-like stream, which occasionally stops, and the patient is obliged to assist its passage by extending his penis, and so producing a vacuum which facilitates the passage of the fluid. By this constant pulling of the penis, a kind of hypertrophy is some-

times induced, the organ being considerably swollen and elongated, whilst the prepuce is often infiltrated with serum. This enlargement, however, gradually subsides as the urine finds a freer passage by the dilatation of the stricture. When the hypertrophy has been considerable, I have observed that virility has been impaired. The patient is often obliged to rise several times during the night to pass his urine, or it may dribble from him unconsciously during sleep. To add to his distress, attacks of complete retention of urine may occur.

The rectum often becomes irritable, the patient suffering much from tenesmus, whilst the sphincter muscle of the bowel may become so relaxed, as to permit a portion of its contents to escape involuntarily during the powerful contractions of the abdominal muscles when straining. Piles and protrusion of the rectum are also likely to occur. The effects of a highly contracted stricture upon other parts of the urinary canal behind the obstruction have been previously described; and it will be recollected that disease of the kidneys may be added to that of the urethra and bladder.

An increased secretion of urine is very common in urethral stricture, especially in its more aggravated forms. The irritability which affects the bladder in such cases may attack the kidneys also, augmenting their secretion, in some instances very considerably. I have known sixty ounces of urine to have been passed in the course of twelve hours. This renal irritability, however, to any great extent, is seldom of long duration, the attack soon passing off, although in old irritable strictures the secretion of urine is usually beyond its healthy proportion.

Incontinence of urine is one of the most annoying accompaniments of bad strictures; the patient being sometimes troubled with a more or less constant dribbling day and night. The incontinence may, however, be but slight, and of little consequence, resulting from a small quantity of urine remaining in the dilated part of the urethra behind the obstruction, and which gradually trickles away after the apparent termination of the act of micturition. This symptom may remain for some length of time after a stricture has been completely dilated, the pouched state of the urethra continuing after removal of the obstruction from which it originated, and probably never entirely disappearing during life. In some instances, however, the continuance of this symptom after dilatation of a stricture depends upon the diseased portion of the urethra not having sufficiently recovered its healthy elasticity, so

that it still forms an obstruction to the passage of the last few drops of urine, which will not, of course, be so forcibly propelled forwards as a larger quantity.

In other cases, the incontinence is much more serious, and often causes mental depression. It is usually observed in strictures of an aggravated kind, in which the urine is passed with great difficulty. In these cases, the bladder is scarcely ever half emptied at any one time, and, from its urgent straining efforts, the elastic tissue surrounding the vesical orifice of the urethra, as well as the compressor urethræ muscle, become so much weakened as to permit the escape of a little urine, especially on any impulsive action of the abdominal muscles, as in coughing. In some of these cases, the patient is so harassed night and day with this dribbling of urine (which is often very fetid), that his linen is kept constantly wet, and he may thus become an object so offensive as to be obliged entirely to exclude himself from society.

Involuntary seminal emissions, when present, add in no slight degree to the mental depression, which, more or less, is a frequent accompaniment of urethral obstructions.

Notwithstanding that the catalogue of a patient's miseries with a bad stricture may be long and fearful, let him console himself with the assurance that they will all of them, most probably, disappear, after the removal of the urethral obstruction. A bladder that at one time would scarcely contain three or four ounces of urine, will usually be found gradually to recover its retentive power as the stricture is opened; and, when the contraction is fully dilated, may be capable of containing from eight to twelve ounces of fluid. There is every reason to suppose that the muscular coat of the bladder becomes thinner when the necessity for its increased action ceases.

It may be as well to notice that the symptoms of stricture in general are mostly aggravated in cold weather, especially such as are predisposed to spasm. For example, a person suffering from stricture will probably be unable to pass his urine whilst exposed to a low temperature in the open air, although on his return to a warm apartment, he may soon, under its influence, recover the power of micturition.

During the vigour of life, urethral stricture may exist for a considerable time without producing any perceptible effects upon the general health. It is well known, that whilst the muscular powers of the system are unimpaired, in proportion to the increase

of the urethral contraction the parietes of the bladder become gradually hypertrophied, by which that organ is enabled, by its greater expulsive efforts, for a long time to discharge its contents without any serious impairment of its functions, notwithstanding the augmentation of the obstruction in the urinary canal.

Sooner or later, however, the bladder becomes seriously affected by the urethral disease, and is unable completely to discharge its contents, when from the irritation caused by too long retained acrid urine, combined with the increased efforts for its expulsion, a low form of inflammation is excited in the vesical mucous membrane. This chronic cystitis soon shows its effects upon the constitution; and, unless the cause of the mischief be removed, a fatal result is sure to follow. In a weak state of the system, and in persons of lax muscular fibre, instead of the bladder increasing in thickness and power, to counteract the urethral obstruction, it becomes gradually weakened, relieving itself with difficulty of its contents.

In the latter case, the constitution suffers much sooner than in the former, from the earlier occurrence of vesical inflammation. As long as the mischief is confined to the urethra, the powers of the constitution are generally but little impaired. It is only when the urethral affection becomes complicated with prostatic, vesical, or renal mischief, that decided constitutional symptoms manifest themselves.

The appearance of a thick, adhesive, ropy mucous deposit in the urine should always be regarded as diagnostic of incipient mischief in the lining membrane of the bladder.

But the symptoms denoting the complications of urethral stricture will be described in their proper place.

Although there are some affections of the urinary organs in which the symptoms bear a striking resemblance to those of stricture, the diagnosis will seldom present much difficulty to the experienced surgeon, as a careful examination of the urethral canal will remove any doubts which might have been previously entertained regarding the true nature of the disease. I am not aware of any case of difficult micturition, simulating stricture, which is likely to be mistaken for that disease, after a proper examination of the urethra has been made.

The two affections which, from the similitude of their symptoms to those of stricture, may be considered as the most likely to be mistaken for that disease, are irritability, and a flabby atonic state

of the urethra—two directly opposite conditions; but both causing more or less difficulty of micturition. In the former, unless extreme caution be observed in the exploration of the canal, it is highly probable that a mere temporary obstacle, the effect of increased sensibility and contractility of the urethra, may be mistaken for an obstruction of a more permanent character. I have indeed known in such cases serious practical errors to result from want of due care and gentleness in the introduction of instruments. The subject of irritability of the urethra will be more fully discussed when treating of the complications of stricture.

The flabby state, or defective contractile power of the urethra, which as a cause of difficult micturition may possibly be sometimes mistaken for stricture, was, I believe, first particularly described by Mr. Hancock, in his valuable and interesting Lettsomian Lecture on "Abnormal Micturition," delivered before the Medical Society of London in 1852. Mr. Hancock made the following observations relating to this subject:—"There are instances where the difficulty of micturition appears to depend upon a relaxed and flabby condition of the urethra, and general want of tone, probably accompanied by more or less want of contractile power of the bladder itself. Such cases are characterised by the general symptoms of stricture, though, in point of fact, there is no stricture present; the patient, by dint of straining, is able to squeeze his urine out by drops, or in a very fine stream. Should the surgeon be misled by these symptoms, and employ a small catheter or bougie, he will rarely succeed in its introduction, whilst his attempts in most instances will be followed by alarming hæmorrhage. On the other hand, a large-sized instrument readily enters the bladder without any impediment whatever to its introduction. In a case where I was consulted, I was told that nothing would pass,—that upon two or three occasions, after futile attempts with small instruments, the bleeding had been so excessive, that no further trial could be made for some weeks, when unfortunately the same degree of bleeding ensued: I passed a No. 12 with ease. But there is a point connected with this form of stricture which is worthy attention: it is, that here a much larger-sized instrument is required to effect a cure than in the ordinary cases of stricture, whether spasmodic or otherwise; for whereas, in the latter instances, the urethra will rarely admit a larger-sized instrument than a No. 13 or 14, in those to which I now allude, a No. 20, or even larger than that, will sometimes be required before the patient experiences

any great degree of benefit. I have known patients, who have had a No. 14 passed with complete facility, express their surprise and disappointment at the slight effect produced upon the flow of urine, or the size of the stream, they even now being able to micturate merely in drops. In fact, it is not until the urethra has been stretched to its utmost without violence to the parts, that any decided benefit is to be derived or to be expected. And here the same rule applies as in ordinary cases, that we may, and indeed should, increase the size of the instrument so long as the orifice of the urethra admits of its introduction without over-distension or the production of pain.

"Patients who suffer from this form of disease, are mostly of irritable temperament, more or less subject to dyspepsia, or have been exposed to great mental anxiety. Great attention, therefore, should be paid to the general state of health at the same time that the local symptoms are treated, whilst the urine should be examined and tested from time to time, to ascertain its condition, as any departure from the healthy and natural standard presents a very decided obstacle to a cure."—*Vide Lancet, April* 3, 1852.

Dr. Wilmot mentions this atonic state of the urethral canal as likely to lead to an error in the diagnosis of stricture, and also describes its opposite state, that of increased contractile power, as productive of a similar mistake. (Wilmot on "Stricture of the Urethra," &c., 1858.) From Dr. Wilmot's description of the latter affection, I presume it is the same which is usually denominated the "irritable urethra."

CHAPTER V.

ON THE INTRODUCTION OF INSTRUMENTS IN THE TREATMENT OF URETHRAL AFFECTIONS.

The patient may either stand before the surgeon, or be placed in a recumbent position. On the first examination it will be prudent to select the latter, as more or less faintness is frequently experienced by persons on the first introduction of an instrument. I generally, however, prefer the erect position, whenever it can be prudently adopted. The end of the penis should be supported between the fore and middle fingers of the left hand, whilst the thumb is placed immediately before the latter, on the lower part of the glans, by which means will be best obtained that perfect control over the urethra, so requisite to the introduction of instruments. The handle of the sound or catheter being turned towards the patient's left groin, and held, like a writing-pen, lightly between the two first fingers and thumb of the right hand, or between the thumb and index finger, the point of the instrument should then be introduced into the urethra, and gradually passed forward, whilst, at the same time, the penis is gently extended. As the sound glides along the urethra, the right hand must be gradually raised and brought within two or three inches of the patient's abdomen, with the instrument in a perpendicular direction. The point of the instrument should now be gently pressed forward as far as it will go without much resistance, under the arch of the pubis, along the upper part of the urethra, which is about an inch below the pubic symphisis, whilst at the same time the penis is put upon the stretch. Having proceeded thus far, the handle of the instrument should now be gradually depressed, until its point has entered the bladder, which in all probability it will readily do if the urethral channel be free from

abnormal obstruction. If, however, the instrument should not enter the bladder, it is most probably pressing against the under surface of the triangular ligament, in which case its point should be withdrawn for an inch, and then again passed onward with the same precautions as before. Mr. Shaw's observations relating to the introduction of instruments should be borne in mind. He observes: "In the natural form of the canal, we see that it becomes suddenly narrow at the bulb. This abrupt diminution of the calibre of the urethra must of itself be a cause of difficulty in passing an instrument. If to this we add the obstruction occasioned by the natural curve of the canal being here likewise suddenly changed (for the ligament is higher than the sinus of the bulb), we shall admit that the mechanical impediments to the introduction of an instrument are greater at this point than at any other." The natural obstacles in the urethra are easily surmounted by careful manipulation. The lacuna magna is to be avoided by keeping the point of the sound to the lower surface of the urethra for about two inches' length; but afterwards, during its whole course, the end of the instrument should be kept well to the upper part of the canal. After having got beyond the lacuna magna, the sound will pass on with facility to the commencement of the bulbous portion of the urethra, where it becomes a little narrower, which slight contraction is often distinctly to be felt; but the part most likely to cause obstruction, if care be not taken to avoid it, is the triangular ligament which passes under the urethra; for unless the end of whatever instrument we may use be kept to the upper part of the canal, it is apt to sink into the sinus of the bulb; and should the handle be then depressed, its point will be caught against the inferior portion of the ligament, at which part most false passages have been made. The error may generally be easily avoided, especially with a solid curved instrument; for as soon as this has passed the pendulous portion of the canal, it is only necessary to keep its well-rounded point steadily along the upper part of the passage, whilst the urethra is at the same time put upon the stretch; by which means the triangular ligament will seldom offer any difficulty.

After having passed the triangular ligament, the point of the instrument may possibly be prevented from entering the bladder by a slight projection of the prostate, or by the ligamentous band at the vesical commencement of the urethra; but by well depressing the handle of the sound, the obstacle is usually surmounted with facility.

Mr. Phillips, in his excellent *Treatise on the Diseases of the Urethra,* has so well explained the reasons for keeping the point of the sound to the upper part of the urethra, after it has passed the lacuna magna, that it may be useful to quote his remarks relating to this fact. Mr. Phillips observes: "The inferior portion of the urethra is yielding; for neither along the penis, nor at the height of the scrotum, nor beneath the pubic symphisis, is it supported by anything solid. In gliding along the canal, the beak of the sound may easily enough push before it the lining membrane of the urethra; for along its surface, we meet, in old men, inflections of the membrane (resulting from its flaccidity), which occasionally have a tendency to arrest the progress of an instrument. Some orifices of mucous follicles, and among others those of the glands of Cowper, are according to general opinion susceptible of receiving and arresting the beak of a sound, especially if it be of small size. Lastly, at the level of the bulb, and in front of the contour of the neck of the bladder, on the sides of the verumontanum, there exist on the inferior surface marked depressions, the orifices of which are presented towards the external orifice of the urethra; against these the beak of the sound presses, and is by them occasionally prevented from making further progress." With regard to the superior part of the urethra, Mr. Phillips remarks that "it is sustained in front by the corpora cavernosa, and behind by the pubic symphisis; it presents great firmness; and we find only longitudinal replications, which are removed by the distension produced by the instrument, and no obstacle is here presented to its progress."

When a narrow stricture has long existed at the bulb, the part of the canal behind the obstruction may have become much dilated, so as to form a depressed pouch below the orifice of the bladder, so that the point of an instrument is apt to catch against the urethro-vesical opening. This pouch is commonly to be avoided by using an instrument with a longer curve than ordinary, although the introduction of the finger into the rectum may, in some instances, be required to assist the direction of its point; the instrument sometimes becomes engaged in one of the dilated prostatic ducts, or entangled in their connecting fibrous bands. In passing a straight instrument the penis must be raised and gently extended, and then no impediment should be experienced until it reaches the middle or transverse portion of the prostate, when its point is to be well raised by depressing the hand; but to enable it to ride over this obstruction the assistance of the finger in the rectum may

sometimes be necessary. In the introduction of the sound it has been recommended to extend the penis, to prevent the point of the instrument being caught in the folds or lacunæ of the urethra. As soon, however, as the beak of the instrument has entered the membranous portion of the canal, the penis should be no longer held, and all traction of the urethra discontinued, which can be productive of no good, but rather harm, after the fixed pubic part of the tube has been attained. It must be evident that the stretching of the movable portion of the urethra can have no effect upon that which is immovably fixed by its pubic attachments.

When the urethral canal is closely contracted in one or more places by tight strictures, the introduction of instruments will require very great tact, gentleness, and patience. For such cases it is impossible to prescribe any rules which would be of the slightest practical utility, as success must entirely depend upon the skill and experience of the surgeon. It may be as well to observe, however, that in many cases of difficulty, after an instrument has entered the bulb, valuable assistance may be obtained by the introduction of the finger into the rectum. When metallic instruments are used, before their introduction they should be warmed either by the hand or by immersing them in warm water.

To facilitate the re-introduction of the catheter in cases presenting unusual difficulty in getting an instrument into the bladder, Civiale had recourse to a very ingenious proceeding, which he thus notices: "At the commencement of my practice I left sometimes in the urethra, when removing the first sound, a conductor, which served as a guide in passing the next. This proceeding, which is not new, requires that the sounds should have a little opening at their extremity. The conductor consists of a metallic wire of sufficient strength, rounded at its extremities, and being rather more than twice the length of the instrument to be removed and of that which is to take its place. This metallic guide is to be introduced into the sound which occupies the urethra; and when a mark previously made shows that it has cleared the opening in the beak of the instrument, the catheter is to be removed from the urethra, care being taken to prevent the wire guide either advancing or receding. The elastic sound which is to replace the one which has been removed, is then to be introduced by reversing the method of proceeding which had been adopted in withdrawing the other, at the same time being always careful that the conducting wire does not leave the bladder. The manœuvre is here limited to the slight

elongation of the penis, and in passing the sound over the wire. In many cases this proceeding is useless; but one sometimes regrets not having had recourse to it, for at the moment when perhaps it is the least expected, the flexible sound refuses to penetrate in defiance of all attempts, although it may be less in size than that for which it is substituted. It is especially when false passages have been made that it may be advantageous to have recourse to a conductor." Civiale observes in a foot-note, that "this proceeding has been reproduced of late as a discovery."—P. 248, *opus cit.*

The only difference between this method of proceeding of Civiale, and the one which has been described and practised by Mr. Solly, is that the guide for the catheter used by the latter consists of catgut instead of metal.

The common method of fixing a catheter in the bladder is by placing a bandage round the waist, to the middle of which is attached a longitudinal band divided up its middle, one end passing on each side between the patient's thighs and scrotum; to these the catheter is secured by tapes passed through the rings of the instrument.

A very simple method for retaining an instrument in the bladder is recommended by Mr. Guthrie. "The catheter," he observes, "which need rarely exceed eight inches, should have a silver extremity, to which two rings are affixed, and to each of which a piece of strong bobbin, ten inches long, is to be attached. The catheter, being introduced to the proper distance, the two pieces of bobbin are to be carried backward along the sides of the penis as far as the pubes; a narrow stick of sticking-plaister is then to be bound round the middle of the penis, and over them, so as to keep them fairly to it. The ends of the bobbin are then to be turned forwards to the outside of the plaister, when they may be tied together on the end of the catheter, which is steadily fixed in its place, subject to any motion of the part generally with which it moves as a whole."

In concluding this subject, let me earnestly recommend the surgical student never to omit any proper opportunity for the introduction of instruments into the bladder, either in the dead or the living. Let him not, in his admiration of the more brilliant operations of surgery, neglect the less showy ones, required in the treatment of diseases of the urethra and bladder. Let him remember that the former are rarely required in comparison with the latter. I can assure those who regard as of slight

importance the apparently trivial operation of passing a bougie or catheter, that there are few instruments which have been productive of greater mischief in unskilful hands, and that dexterity in their use is as requisite as in any part of operative surgery. The following quotations will surely be sufficient to prove the importance of the advice here given:—

"The operation of introducing a catheter through what has been called an impermeable stricture, is, without doubt, the most difficult in the whole range of surgical operations, and requires all the prudence, science, and skill of a master."—*Liston's Operative Surgery.*

"The introduction of the catheter, although apparently very simple, is one of the nicest and most delicate processes in surgery. It requires skill of the highest order, as well as the most intimate knowledge of the anatomy of the urinary organs. If I were called upon to state what I considered as the most important operation that a practitioner is obliged to perform, I should unhesitatingly say, the introduction of the catheter. It is true, the most untutored and awkward surgeon may occasionally, nay, perhaps, not unfrequently does, reach the bladder without difficulty; but let such an individual attempt the passage of the instrument when there is some mechanical obstacle, as a stricture or an enlarged prostate, and he will be sure to be foiled."—*Gross on Diseases and Injuries of the Urinary Bladder, the Prostate Gland, and the Urethra.*

"The operation of catheterism (the name given to the introduction of catheters into the bladder) is, under all circumstances, whether in the healthy or diseased state of the urinary organs, one of the most delicate and difficult in surgery; whilst, in seeing it practised by a skilful surgeon, it appears to be one of the most simple and most easy. It requires from those who practise it, besides the most exact anatomical knowledge, much dexterity, a very fine and delicate touch, great experience, extreme prudence, and unbounded patience."—*Traité pratique sur les Maladies des Organes Genito-Urinanes, par le Docteur Civiale.*

CHAPTER VI.

ANATOMY OF THE URETHRA.

It is not my intention to occupy the pages of this Treatise with a minute account of the anatomy of the urethra, which, to answer any useful practical purpose, can only be properly acquired by dissection.

I shall therefore restrict myself to a brief description of such points as bear more especially upon the pathology and treatment of urethral stricture.

The urethra is the membranous canal extending from the neck of the urinary bladder to the external meatus, at the orifice of the glans penis. It has usually been described as consisting of two layers, an inner or mucous coat, and an outer or elastic fibrous coat, with an intervening cellular substance. In addition to these, a peculiar muscular apparatus has lately been discovered by Messrs. Hancock and Kölliker.

The urethra is very properly described as consisting of three regions—the spongy, the membranous, and the prostatic; so named from their anatomical peculiarities. The spongy portion, so called from the sponge-like erectile tissue which is so intimately connected with that part of the urethral canal, extends from the external meatus to the termination of the bulb, which is a mere enlargement of precisely similar structure, the principal expansion being at its inferior part. By some anatomists the bulb, which is about an inch in length, is regarded as forming one of the regions of the urethra, thus dividing the canal into four distinct portions. The spongy portion, which comprises the greater part of the canal from its forming a part of the penis, varies considerably in length. Supposing the urethra to be eight inches and a half in length, the spongy part may be estimated at six and a half, allowing two inches for the membranous and prostatic portion. The

membranous portion of the urethra extends from the anterior part of the prostate to the bulb. From its being slightly covered at its under-surface by the bulb, it is rather shorter below than above. It forms a slight curve under the pubic arch, its concavity being upwards. The membranous portion of the urethra is about an inch beneath the symphisis pubis, and, perforating the triangular ligament in front of the bony arch, immediately joins the bulb. With the exception of the external meatus, this is the narrowest part of the canal, and is rather less than an inch in length; it is situated between the layers of the deep perineal fascia, and is surrounded by the compressor urethræ muscle. It consists of the mucous membrane, the elastic fibrous coat, the compressor urethræ muscle, and the muscular fibres of Hancock and Kölliker. It is supposed to have derived its name of "membranous" from the facility with which, in comparison with other parts of the urethral canal, it can be separated from its surrounding covering, as well as from the slight thickness of its natural tissues when thus deprived of their usual investments. As a compensation for its natural thinness, this part of the urethra is surrounded by strong muscular fibres, which have been ably described by Wilson and Guthrie, whose names they bear. Anatomists differ materially as to the length of the urethra, their estimate varying from eight to eleven inches. The only method of examining the length of the urethra which can be of practical utility is on the living body. Mr. Adams, in his description of the urethra, in Dr. Todd's "Cyclopædia of Anatomy and Physiology," states, that the late Mr. Briggs, observing that most of his predecessors had examined the urethra after death, made a series of examinations on the living subject. He introduced into the bladder a catheter without a stilet, on the stem of which was marked a graduated scale of inches and fractional parts, measured from the eye of the instrument. As soon as the urine begins to flow from the catheter, which has only one eye, the line marked on the stem corresponding with the external meatus, will necessarily indicate the exact length of the canal. Of sixty persons in whom the urethra was measured thus, the length was found to vary from six inches and three-quarters to eight inches and a half. In eight instances, or rather less than one-seventh of the whole (twenty of them being persons of short stature, or not exceeding five feet four inches in height), the length of the urethra was found to be under seven inches. In forty-five instances, or three-fourths of the number, *i.e.* in persons of middle stature, the measure-

ment was found to be between seven and eight inches, and in a few it exceeded eight. In some instances of very corpulent subjects, at an advanced age, the urethra was found to be ten inches in length. Mr. Briggs considers the average length of the canal to be seven inches and a half or seven inches and three quarters, the external parts being in a natural condition, neither hanging in a loose, flabby state, nor unusually retracted. He found the proportions of the various parts of the canal to stand relatively thus: from the orifice to the membranous part, six inches and a half; from thence to the bladder, one inch and three quarters. The late Mr. Guthrie, in his lectures on the "Anatomy and Diseases of the Bladder and Urethra," has the following observations regarding the length of the urethra :—"I place no reliance whatever on the measurement of the urethra made after death, for although it may be then eleven inches long, I never met with a case, unless there was a diseased prostate, in which a catheter ten inches long was required to draw water: on the contrary, one eight inches long will generally be found sufficient, and I have known one of seven answer well; the additional inches being usually gained by the elongation or stretching of the parts during life or after death; and if a surgeon calculate inches as his instrument proceeds, instead of considering the points of attachment as so many landmarks to guide his progress, he will be frequently in error, and always liable to do mischief."

The observations of M. Leroy d' Etiolles agree with those of Mr. Guthrie. M. Leroy informs us, that the result of a hundred similar examinations made by him upon the living subject was, that the mean length of the urethra is eight inches. The length of the spongy portion of the urethra is, of course, very uncertain, and is of no consequence in a surgical point of view. In the length of the membranous portion there is little variation; but the prostatic, which is usually but little more than an inch in extent, in cases of prostatic enlargement becomes considerably elongated. With regard to the diameter of the urethra, Mr. Guthrie has the following remarks:—"The width or diameter of the urethra is so very uncertain, varying so much in different people, that it is scarcely worth while inquiring into it, more particularly as the passage of instruments is always regulated by the size of the orifice of admission. Taking as an example a well-formed urethra, the orifice will be found to be the smallest part, with relation to every portion of the passage. I know but of one exception, and that is in some few people whose orifice is rather large; and in whom the

narrowest part is situated in sight, and about a quarter of an inch within it. This is a natural formation, and the person is perfectly sound; but this part is sometimes the seat of stricture, in which case it should always be divided with a small blunt-ended knife. The relief is immediate in the subsidence of the symptoms of irritation. From this part, through the spongy portion, the instrument will pass with perfect ease, until it reaches the commencement of the bulbous portion, where the urethra becomes a little narrower, and which diminution may become sensible to the hand. This bulbous portion of the urethra is said to be larger than the anterior part; but I do not believe that it is, although it may appear so, from a slight contraction at the commencement of the membranous part, which makes it the smallest of all, except the orifice, which is invariably the least, both as to diameter or circumference, when dilated by a round instrument.

"As to the positive size of the urethra, I can only say, I have a solid bougie which is rather more than half an inch in diameter; I had it made for one gentleman in particular, and it passed with perfect ease through the whole passage. Very few urethras will, however, admit a sound larger than from twelve to sixteen. The dimensions of the urethra are not influenced by the size of the penis, as far as I have been able to observe. The orifice of the urethra is, then, with the exception I have stated, the smallest part of the canal, and the least capable of extension, while every other part may be stretched to nearly twice its natural size, without much difficulty; but the orifice scarcely yields without tearing, and this occurs from the peculiar dense structure of which its very edge is formed—a structure peculiar to the part, but in some degree analogous to that which forms the edge of the eyelid. If this be destroyed by ulceration, its value and utility is seen, for the part from which it has been removed contracts; and if the whole of the orifice has been deprived of its edge, the opening becomes so small, as to act in a similar manner to a stricture, and to give rise to equally distressing symptoms, whilst it is also the most difficult of cure."

The mucous urethral membrane is continuous with the lining membrane of the bladder, and is connected at the meatus with the delicate covering of the glans penis; the mucous membrane is described by anatomists as usually arranged in folds, having furrows between them. Occupying the whole length of the spongy portion, are observed a considerable number of minute openings.

These openings are the orifices of the mucous glands, or lacunæ,

and are directed forwards towards the meatus. The ducts, which open on the free surface of the urethra, pass backwards to the extent of from two to six lines, or more, to their glands, which are situated in the submucous tissue. Within about half, or one-third of an inch, from the external urethral orifice, on the superior surface of the canal, is situated the lacuna magna, so named from its large size. It forms a little pouch, into which the end of a common probe can be passed. The mucous glands, in their normal state, secrete a thin bland fluid for the lubrication of the lining membrane.

From the excellent description of the urethra by Mr. Adams, previously mentioned, I shall quote the following passage:—

"The urethral membrane is divisible into two distinct layers. The inner, analogous to other mucous surfaces, consists of a basement membrane covered throughout by epithelium. This, for the most part, is of a scaly character, but in the vicinity of the bladder it is spheroidal.

"Beneath the mucous membrane there is a layer composed of a tissue of a mixed character, containing some contractile fibres, supposed to be muscular, blended with elastic tissue. It is connected to the delicate tendinous covering of the corpus spongiosum, and is supported by transverse tendinous bands distinctly visible beneath it. This layer is thicker in the membranous than in other parts of the urethra. When examined with the microscope, it presents abundant evidence of the existence of contractile fibre mixed with common elastic tissue. The blood-vessels from the spongy body shoot through it. According to Kölliker, the following is the arrangement of the submucous layer. It is termed by him the simple muscular tissue. Its relations are most complicated in the prostate gland and the prostatic portion of the urethra, which are rich in muscular fibres. So large is the quantity of the tissue in the gland itself, that the glandular structure constitutes scarcely one-third or the fourth of the whole. The longitudinal fibrous layer of the prostatic part is connected, internally, to the sphincter vesicæ, by a thin and indistinct layer of fibres with some of the longitudinal muscular fibres of the bladder, but by far the greater part of it is unconnected with the latter. It consists of half fibro-cellular tissue with many nucleus-fibres, and half of evident, smooth, muscular fibres with nuclei. After this, and external to it, follows, secondly, a strong layer of yellowish circular fibres of muscular and elastic tissue. On removing the several muscular layers, we come at last to the proper glandular tissue of the pros-

tate, of which individual lobes penetrate among the circular fibres just mentioned, their excretory ducts passing through the longitudinal fibres.

"On laying open the urethra from its origin at the neck of the bladder, the first structure we meet with is the caput gallinaginis, an elongated body situated on the floor of the prostatic part of the urethra; it varies in length from three quarters of an inch to an inch. The caput gallinaginis divides the prostatic sinus into two lateral depressions, into which the secretion of the prostate gland is poured. At the most elevated portion of the caput gallinaginis is a depression formed by an inflexion of mucous membrane facing forwards, generally capable of admitting the blunt end of a common probe; in some cases, it can be traced down beneath the third lobe of the prostate to the extent of the third, or even the half of an inch—it is called the sinus pocularis. On either side of this, between the laminæ, or beneath it, are the terminations of the ejaculatory ducts."

The late interesting microscopical researches of Mr. Hancock have indisputably proved the muscularity of the urethra. Kölliker, of Wurtzburg, however, previously to Mr. Hancock's discovery, had, unknown to the latter, also noticed the involuntary muscular fibres of the urethra. In his published "Lettsomian Lectures for 1852," Mr. Hancock has described his own and Kölliker's share in the discovery of the muscularity of the urethra. Mr. Hancock introduces the subject by the following remark:—"I would only observe that, whilst I willingly concede to Kölliker the priority of *noticing* these fibres, I claim for myself the credit of *describing* their situation and arrangement, and their importance as bearing upon practical points." After a statement of Kölliker's account of the muscularity of the urethra, Mr. Hancock gives us the following result of his own researches:—"The organic muscular fibres in the prostate gland, connected with the urethra, are continuous with those of the internal muscular coat of the bladder, whence they may be traced by careful examination, passing forwards through the prostate gland. These fibres, destined to invest the membranous and other portions of the urethra, appear to me to be entirely distinct from the organic muscular fibres found in large quantities throughout the gland, particularly around the sinus pocularis in the verumontanum or caput gallinaginis, where the principal excretory ducts of the gland, with the common ejaculatory ducts, open. Organic muscular fibres surround the various ducts which permeate the gland in all directions, and may, in the

instance of the common ejaculatory ducts, be traced into the gland from the vas deferens, where they may readily be seen. The same arrangement obtains around the proper excretory ducts of the gland, and is beautifully shown where calculi are present in any quantity or size, in which case the foreign body may be seen impacted in the duct or cell with a circle of these organic fibres surrounding it. The muscular fibres are best seen in the prostate of a fœtus of between six and nine months, at which age the muscular fibres are very distinct, owing to the phosphatic deposits and fatty degeneration which takes place in the prostate gland at that period of life.

"The organic muscular fibres found generally throughout the prostate gland, belong, in a great measure, I believe, to the numerous vessels and ducts which ramify so freely through this body, as Mr. Guthrie has pointed out; and Mr. Quekett has proved the existence of muscular fibres in the coats of arteries; but these general fibres are, as I have before observed, distinct from those derived from the inner layer of the muscular coat of the bladder, and which form a layer surrounding the prostatic portion of the urethra, separated from it merely by elastic and non-elastic areolar tissue. (Kölliker says these fibres, for the most part, have no connexion with the muscles of the bladder.) The outer layer of the muscular coat of the bladder, on the contrary, passes forwards on the outside of the prostate gland, and laterally and inferiorily joins the fibres derived from the inner coat in front of the prostate gland, to assist in forming the organic muscular covering of the membranous portion of the urethra; whilst, superiorly, or on the upper surface of the gland, these external longitudinal fibres are arranged in two or more bundles, which are attached, as Mr. Guthrie pointed out in the year 1830, to the pubis near its symphisis. From the front of the prostate the conjoined layer of organic fibres passes forwards to the bulb, investing the membranous portion of the urethra, covered by, but distinct from, the common muscles of the part, the latter being inorganic, voluntary, or striated; these being organic and nucleated. Arrived, however, at the bulb, these two layers again part company and extend forwards through the whole length of the spongy portion of the urethra, the internal layer running between the corpus spongiosum itself and the urethra, but separated from the latter by areolar tissue; the external lying on the outside of the corpus spongiosum, separating the proper spongy tissue from its fibrous investment. Upon reaching the anterior extremity of the urethra, these two

layers again unite, and form a circular body or band of organic muscular fibres, constituting that peculiar structure usually denominated the 'lips of the urethra,' and which had previously been considered by Mr. Guthrie, as surrounded by a peculiarly dense structure, analogous to that which forms the edge of the eyelid, and which he believed was requisite to maintain the patency of the opening; so that not only have we the urethra supplied by a coat of organic or involuntary muscular fibre, but the spongy body itself lies between its two layers of involuntary muscle; an arrangement, doubtless, of very great importance in relation to the due performance of the functions of the part. And, as regards the urethra, this arrangement holds good wherever we find the spongy tissue, whether the quantity of that tissue be small or great; for, at the glans, which is formed not only by increased development, but also by a folding back, as it were, of the corpus spongiosum, upon the corpora cavernosa, we have these muscular layers multiplied, whilst, on the upper surface of the urethra, where there is merely a narrow portion of corpus spongiosum, the same arrangement holds good. Independent of these layers of organic muscular tissue, nucleated fibres may be found distributed occasionally throughout the spongy tissue, but I think they belong more properly to the arteries of the part."

With regard to the muscularity of the prostate, Mr. Hancock observes: "I knew that the muscularity of the prostate gland had been hinted at, but I was not aware until I spoke to Mr. Quekett upon the matter, that, although he had not published, he had some years previously established the fact, but had not pursued the matter further. Therefore, as regards the prostate gland, the credit of priority is due to that gentleman."

There are three muscles, the action of which, from their close connexion with the urethral canal, should be particularly studied. These are the compressor urethræ, the levator ani, and the accelerator urinæ. A full and interesting description of the first muscle will be found in Mr. Guthrie's "Lectures on the Urethra." Erasmus Wilson, in his "Anatomist's Vade Mecum," gives the following concise description of the muscle:—"The compressor urethræ (Wilson's and Guthrie's muscles) consists of two portions, one of which is transverse in its direction and passes inwards, to embrace the membranous urethra; the other is perpendicular, and descends from the pubis. The transverse portion, particularly described by Mr. Guthrie, arises, by a narrow tendinous point,

from the upper part of the ramus of the ischium, on each side, and divides into two fasciculi, which pass inwards and slightly upwards, and embrace the membranous portion of the urethra and Cowper's glands. As they pass towards the urethra, they spread out and become fan-shaped, and are inserted into a tendinous raphé upon the upper and lower surfaces of the urethra, with which they are connected in front. When seen from above, these portions resemble two fans, connected by their expanded border along the middle line of the membranous urethra, from the prostate to the bulbous portion of the urethra. The same appearance is obtained by viewing them from below."

The perpendicular portion, described by Mr. Wilson, arises by two tendinous points from the inner surface of the arch of the pubis, on each side of and close to the symphisis. The tendinous origins soon become muscular, and descend perpendicularly, to be inserted into the upper fasciculus of the transverse portion of the muscle; so that it is not a distinct muscle surrounding the membranous portion of the urethra, and supporting it as in a sling, as described by Mr. Wilson, but merely an upper origin of the transverse muscle. The compressor urethræ may be considered either as two symmetrical muscles meeting at the raphé, or as a single muscle. I have adopted the latter course in the above description, as appearing to me the more consistent with the general connexions of the muscle and with its actions.

The "compressor urethræ, taking its fixed point from the ramus of the ischium at each side, can," says Mr. Guthrie, "compress the urethra so as to close it, I conceive completely, after the manner of a sphincter. The transverse portion will also have a tendency to draw the urethra downwards, whilst the perpendicular portion will draw it upwards towards the pubis. The inferior fasciculus of the transverse muscle, enclosing Cowper's glands, will assist these bodies in evacuating their secretion."

"The acceleratores urinæ," as described by Mr. Wilson, "arise from a tendinous point on the centre of the perineum and from the raphé. From these origins the fibres divulge, like the plumes of a pen; the posterior fibres to be inserted into the ramus of the pubis and ischium, the middle to encircle the corpus spongiosum and meet upon its upper side; and the anterior to spread out upon the corpus cavernosum on each side, and be inserted, partly into its fibrous structure and partly into the fascia of the penis. The posterior and middle insertions of these muscles are best seen by

carefully raising one muscle from the corpus spongiosum and tracing its fibres.

"The acceleratores urinæ being continuous at the middle line and attached on each side to the bone, by means of their posterior fibres will support the bulbous portion of the urethra, and acting suddenly will propel the semen, or the last drops of urine, from the canal. The posterior and middle fibres, according to Krause, contribute towards the erection of the corpus spongiosum, by producing compression upon the venous structure of the bulb; and the anterior fibres, according to Tyrrell, assist in the erection of the entire organ by compressing the vena dorsalis, by means of their insertion into the fascia penis."

The levator ani is described by the same author as "a thin plane of muscular fibres, situated on each side of the pelvis. It arises from the inner surface of the pubis, from the spine of the ischium, and between these points from the angle of division between the obturator and the pelvic fascia. Its fibres descend to be inserted into the extremity of the coccyx into a fibrous raphé in front of that bone, into the lower part of the rectum, base of the bladder, and prostate gland." From the connexion of the anterior fibres of this muscle with the neck of the bladder and prostate gland, it is evident that it may exert more or less influence in some of the diseases of the neck of the bladder and urethra.

I cannot conclude this part of my subject better than by a quotation from the valuable work of Mr. B. Phillips, entitled "A Treatise on the Urethra; its Diseases, especially Stricture, and their Cure." Mr. Phillips, in concluding his observations on the treatment of stricture, remarks, "I would, in conclusion, urgently recommend practitioners, as they value the safety of their patients, or their own peace of mind, sedulously to cultivate an intimate knowledge of the anatomy of the urethra before they attempt to perform either of the operations for the removal of stricture; for certainly no operations require for their successful performance a more intimate knowledge of the structure of the passage in health, and the changes produced in it by disease, than those which are performed upon the urethra. It is a duty I owe to the public, to the profession, and to myself, to impress this upon their attention; for it is a humiliating reflection, but which is nevertheless most true, that the greater number of complicated cases which are met with, have been wholly caused by the unskilful treatment of the persons to whose care they have been entrusted."—P. 233.

CHAPTER VII.

TREATMENT OF STRICTURES OF THE URETHRA.

From the formidable character which the disease sometimes assumes in its more advanced and aggravated forms, the treatment of urethral stricture has long engaged the attention of the best practical surgeons of the day.

There are probably few diseases that require greater skill and judgment in their management than obstructions of the male urethra. There are none, I believe, in which more mischief is done by rough handling; very great care and gentleness, with no ordinary share of patience, being absolutely essential for the successful treatment of many of the more intractable cases. In its diseased state, the urethra often becomes highly sensitive; and when the introduction of instruments is required, to be used with advantage to the patient, it is evident that lightness of hand and delicacy of touch are indispensable qualifications in the surgeon who employs them.

For the successful treatment of its diseases, the urethra must be viewed physiologically, and not merely according to the morbid transitions which it has undergone. The extreme delicacy of its lining membrane and great vascularity of the subjacent textures, as well as the constitutional sympathies often excited if it be roughly handled, must all be carefully considered. The urethra should, in fact, be regarded as an extremely sensitive canal, endowed with a high degree of vitality, and not treated mechanically, as though it were nothing more than a mere inert lifeless tube, in which holes can be drilled or obstructions broken down with impunity. With this view of the subject, when introducing instruments into the urethra, the surgeon will constantly bear in mind that by art, not force, his object is to be accomplished; consequently, all his manipulations are conducted with extreme

gentleness and caution. Notwithstanding the best rules that can be given for his guidance, as manual dexterity can only be acquired by practice, the young surgeon will see the necessity of availing himself of every legitimate opportunity for the introduction of instruments into the bladder in the living subject.

Although stricture of the urethra, when properly treated in its early stage, is comparatively of slight importance, in its more advanced state, when, in fact, surgical aid is required, it is frequently a source of very great suffering to the unfortunate patient, rendering his life truly miserable, and taxing to the utmost the skill and patience, as well as perseverance of the surgeon.

Permanent stricture of the urethra is *essentially* a surgical disease; for although medicine may do much to mitigate suffering by improving the general health when impaired, by allaying irritation, and by keeping the urine, which should be frequently tested, in as healthy a state as possible, the *cure* of the complaint can only be effected by the manipulations of the surgeon.

Civiale thus commences his observations on the treatment of urethral stricture:—"Two principal points often neglected in the treatment of urethral contractions, which the practitioner should especially bear in mind, are, that difficulties of micturition produce nearly all the disorders, local and general, which are attributed to organic strictures, and that these may be temporarily increased by spasmodic contractions, causing them to appear much more serious than they are in reality. This last point, which I have already signalized, in exposing the results of *post-mortem* examinations, is of the highest importance for the direction of the treatment.

"There are two indications to be fulfilled—to contend with the difficulties of micturition, or the retention of urine; and to attack the contraction which is their principal cause. That which renders the situation difficult is, that we are reduced in many cases to direct our efforts to relieve an effect while the cause persists. Though the order in which I have placed the two indications seems interverted, it is not so, because we cannot suddenly cause the contraction to disappear, and that there is always an urgency to relieve the retention of urine. On the other hand, the treatment should have for its end not only the dilatation of the urethra as an inert canal, but the re-establishment of the normal contractility and elasticity of its parietes, since one sees every day patients who have employed the treatment by the retention of gum elastic catheters during many months, and who cannot micturate although

dilatation has been carried on as far as the susceptibility of the canal will permit."—*Opus cit.*

Whatever may have been the differences of opinion entertained by various surgeons as to the best means of its accomplishment, the restoration of the obstructed urethral canal as nearly as possible to its healthy calibre, has been the object of all.

That this object is not always effected without considerable difficulty is evidenced by the great number and variety of instruments which have been invented for the purpose.

The means adopted by surgeons for the relief or cure of urethral strictures are usually classed under three heads:—1, Dilatation; 2, The application of some escharotic substance to the diseased tissues of the urethra; 3rd, Division of the stricture, either from within the canal by some cutting instrument, as the lancetted catheter, or by some one or more of a host of other contrivances; or from without, by external incision, now commonly called perineal section.

TREATMENT BY DILATATION.

The three methods above mentioned, it appears to me, might very properly be included under the first head, as the two latter will very seldom prove effectual without the aid of the bougie, or some other dilating instrument. The term dilatation is, however, usually restricted to the method in which dilating instruments only are used, that process being effected without resorting either to escharotics or incisions. This unaided or simple dilatation is the method upon which, for a long time, British surgeons have principally placed their reliance for the relief or cure of urethral stricture.

There is, I believe, no better method of proceeding in a large proportion of cases, and such have been its successful results that many very able surgeons have discountenanced every other mode of treatment. How, then, it may naturally be asked, does it happen that a plan of treatment which has proved so efficacious in the hands of some should so singularly have failed with others of equal surgical celebrity? indeed, so unsatisfactory with the latter have often been its effects as to cause them to resort to treatment more severe and sometimes even hazardous.

This discrepancy evidently admits but of one explanation, and that is, the particular manner in which dilatation is conducted.

My own experience has long convinced me, that the great error with regard to dilatation has been an attempt to do too much at a time, by which the disease has been aggravated instead of relieved. The urethra has, in fact, been treated too roughly. Who can wonder at the failure of dilatation when that process is carried on by forcible attempts to stretch a diseased and sensitive part of the urethral canal? It is true that the immediate effect of these forcible attempts, by opening more or less the contracted channel, may permit the urine, for a little time, to pass in an improved stream; an improvement, however, usually but of short duration, as the irritation and inflammation which are almost certain to ensue, will, in nine cases out of ten, render the condition of the patient rather worse than better. Nevertheless, it must be admitted, that there are some hard, gristly, insensitive strictures which will bear pretty rough handling with impunity.

It is almost needless to remark, that the forcible, unscientific manner in which dilatation is occasionally practised, is the abuse and not the proper use of this most admirable of all methods of treating the generality of urethral strictures. It may be taken for granted, that this treatment will be most successful in the hands of those who use all possible gentleness and caution in the introduction of instruments. Let it be taken for granted, also, that it is only by the exercise of great forbearance and a firm resolution to devote the requisite time and attention to every case, which will enable the surgeon to do full justice to this simplest of all methods of procedure.

I think it will be admitted by those who have had much experience in urethral surgery, that the greatest difficulties which are met with in effecting dilatation originate principally from the previous abuse of instruments.

In the present day the instruments mostly used in the dilatation of strictures, are bougies, catheters, and solid metallic sounds. There are also special dilators, which are occasionally employed with the view of accomplishing dilatation more rapidly than by the ordinary means.

It is not unusual for surgeons to evince a strong partiality for the employment of some particular instrument in effecting dilatation.

One surgeon of high repute has acquired such dexterity in the use of the silver catheter as to induce him to recommend it as the only instrument which should be employed in the dilatation of

urethral obstructions. Many surgeons have a strong bias in favour of the solid metallic sound; others show a preference either for the elastic gum, wax, or plaster bougies; whilst, according to others, special dilators are the proper instruments to use.

It may be, that the advocates for the employment of one particular dilator in preference to all others, have acquired such extraordinary skill in its use as to enable them to accomplish with it all that can be done by dilatation. With the above exceptions, in which unusual dexterity may have been acquired in the use of some one instrument, I shall merely remark, as a general rule, that no judicious surgeon will restrict himself to the employment of any one of these dilators, as they will most assuredly all be found to be more or less useful, some succeeding best in one case, and some in another.

If, however, I were restricted to the use of but one kind of instrument, my selection would be the simplest of all, the wax and plaster bougie, varying from a consistence soft enough to receive the impression of a stricture, to such a degree of hardness as would not readily yield to pressure. However inefficient the bougie would undoubtedly prove in some instances, I believe that it would enable me to effect more good, in a large majority of cases, than any other single dilating instrument.

Bougies.—These appear to have been for a long time almost the only instruments which were employed in the dilatation of urethral stricture. According to Civiale, it was not until towards the end of the sixteenth century, after the publication of the works of Alphonse Ferri, of André Lacuna, and others, that the employment of bougies began seriously to fix the attention of surgeons.

An infinite variety of medicinal substances were used in the construction of bougies, much mystery being observed with regard to their composition. To quote the words of Civiale—"The simple summary of all which has been written relative to medicated bougies would fill a large volume, the reading of which would be as tedious as it would be uninstructive."—*Opus cit.*

The bougies at present employed are known as the wax and plaster, the elastic gum, the catgut, the gutta-percha, and the metallic. Of these, wax bougies are the softest, and are now chiefly used to take a cast or impression of the face of a stricture, although they are sometimes employed with advantage in irritable strictures. The plaster bougies, manufactured in London, are very useful instruments, and are made of various degrees of

consistence, by rolling upon strips of fine linen an admixture of lead plaster, of olive oil and wax, in different proportions. The elastic gum bougie is a favourite instrument with many practitioners, and is much used in France, as is also the conical bougie, which gradually tapers from an inch and a half to two inches from its point. I do not often use the former, as its extreme flexibility renders it difficult to know precisely where the point of the instrument is pressing. The latter has always appeared to me objectionable; for, unless of very small size, should it meet with obstruction in passing along the urethra, it will be almost impossible to know whether the point of the bougie, or its increasing diameter, constitutes the impediment to its advance.

Conical sounds, either of silver, or of steel plated, may, however, be used with great advantage in hard, gristly contractions. I have found them very useful in traumatic strictures. Those of solid silver, from their greater solidity than such as are made of steel, are the best dilators in fibroid unyielding strictures.

The gutta-percha bougie I have used only in a very few cases, to take an impression of the face of a stricture, for which purpose it is very well adapted. The catgut bougie, as it acquires a slight increase of size, after it has entered the obstruction, from the moistening effect of the mucous secretion of the urethra, may sometimes be advantageously employed in highly contracted strictures, and has often proved useful in cases of retention of urine.

Dr. Gross, when making an examination of a stricture, sometimes uses a graduated bougie, with cobbler's wax at its point. Sir G. Bell occasionally employed a ball-headed silver probe for the same purpose. With regard to the form of the bougie, the cylindrical is that which is generally used. The conical instrument is, however, preferred by many surgeons, especially in France. The gum-elastic bougie, with an olivary projection at its tip, is recommended by Civiale, and other French practitioners, as being very useful in ascertaining the extent of a stricture. The fusiform bougie has also its admirers.

I believe that, in general, the cylindrical bougie, slightly tapering for a quarter of an inch from its point, will be found the most useful, as well as the safest kind to use.

The instruments having a slight olivary-headed projection, are undoubtedly the best which can be used to ascertain the length of

a stricture. The solid instruments made of flexible metal, called metallic bougies, which are sometimes used, have always appeared to me to be very inferior to those made of steel or silver, as being likely to lose their proper curve by bending; nor have they any particular quality, that I am aware of, to recommend them in preference to others of greater firmness.

Catheters and Sounds.—The gum elastic catheter is a most useful instrument, and is often used with very great advantage in the treatment of stricture. Gum catheters should be kept of their proper curve by a stilet, and they may be used with or without it, as occasion may require. Steel sounds, plated with silver, to preserve them from rust, with a moderate curve, when the urethra will bear them without irritation, will often be found highly serviceable; indeed, in old hard strictures they are, in many cases, the only efficient dilators. A solid silver sound is, of course, equally efficient; but from its being more expensive than the steel instrument, it is not so generally used. Silver catheters are also very useful, especially when a stricture has been for some time impermeable; for should the surgeon succeed in passing a small one into the bladder, it can be retained as long as advisable, its retention often proving very advantageous to the patient.

The intervals for the introduction of instruments, and the time they should be retained, must be regulated by the degree of irritability of the urethra generally, as well as at the seat of disease, also upon the tolerance of the bladder in each particular case, the latter being commonly more or less disposed to contraction.

Very little attention will be sufficient to instruct the surgeon what length of time it is best to allow an instrument to be retained, as also the proper period for its re-introduction. As a general rule, instruments should not be kept in the urethra less than from five to twenty minutes, if they can be borne without much irritation. In old, hard, insensible strictures, I generally let them remain from half an hour to an hour. The mere passing a bougie and permitting it to remain but for "one or two seconds," as has lately been so confidently recommended, will, I believe, often increase the irritation of a stricture, when the retention of the instrument for a few minutes would have considerably diminished its morbid sensibility. It should always be borne in mind, when we are dilating a stricture, that the bougie exerts a mechanical as well as vital action.

Dilatation has been usually divided into two kinds, by English writers on the subject,—the temporary, and the permanent or continuous. The latter has been described by Civiale, Leroy d'Etiolles, and other French authors, under two heads,—"the slow permanent progressive dilatation," and "the rapid permanent, or forced progressive dilatation." The distinction between the two is, that in the former the process of dilatation is effected in a very gradual manner, by allowing an interval of from one to three or four days to elapse before increasing the size of the dilating instrument; whilst in the latter, the stricture is more rapidly and forcibly dilated, a larger catheter being substituted for the one previously employed, at periods commonly of from eight to twelve hours.

In both kinds of permanent dilatation the elastic gum catheter is chiefly used, as it is much less likely than are metallic instruments to cause urethral irritation.

I. ON TEMPORARY DILATATION.

This method of treatment is that which is usually adopted by British surgeons for the relief or cure of a very large proportion of urethral strictures. It has many advantages not possessed by permanent dilatation, as it causes so slight a degree of pain or irritation as seldom to interfere, even for a day, with the usual avocations of the patient.

There is one rule of conduct which every surgeon will do well to follow in this mode of treatment, which is, to endeavour to effect the dilatation of a stricture with as little irritation of the diseased urethral tissues as is compatible with the attainment of his object. I am sure that the more strictly this rule is followed in dilatation the more satisfactory will be its results.

It may be well here to observe, that for the mere dilatation of a stricture it is quite unnecessary to pass the dilating instrument into the bladder. As a general rule, therefore, if there be no morbid sensibility at the vesical neck, which is likely to be relieved by the contact of the bougie, it should not be passed so far as the bladder, where it may very probably cause useless irritation.

It must be evident that no rule as to the best method of commencing dilatation can be prescribed which would apply to all cases. I believe, however, that the one most generally applic-

able is to commence with the common bougie, and to continue its use until some little progress has been made, when the irritability of the diseased tissues, as well as of the entire urethra, will have become so much subdued as to permit, without irritation, the employment of more solid, and, in many instances, more efficient dilators.

In irritable strictures the soft wax bougie is infinitely superior to any other dilator, and its use should not be discontinued until a considerable diminution of their irritability has been effected. When dilating a stricture, before increasing the size of the bougie or sound, the one last used should be passed; and, in cases in which there is a strong tendency to recontraction, it will be advantageous first to open the obstruction by an instrument of less calibre than the one previously introduced. The retention of this for a short time will generally very much facilitate the introduction of a larger-sized instrument. The rule should be to commence each successive dilatation with an instrument of such a size as can be easily passed through the contraction.

However desirable it may be to commence the dilatation with the bougie, it is not practicable in all cases, especially in old, hard, irregular, highly-contracted strictures, in which the more solid dilators of steel or silver are the only dilating instruments that can be employed with advantage. Some strictures are so strongly disposed to contraction on very slight distension that it will be impossible to make any satisfactory progress, unless their dilatation be conducted very gradually and cautiously. In such cases it is highly desirable that the surgeon should be provided with instruments of sizes intermediate between those commonly used in England. I have long been in the habit of using, with advantage, bougies of fractional ascendant sizes in some of the more irritable forms of urethral contraction, in which any dilatation, to be efficient, must, for some little time, be almost imperceptibly effected. Bougies of thirty-six numbers, between our 1 and 12, are, I believe, very commonly used in France, and, doubtless, in many cases with advantage.

Before proceeding to the examination of a person supposed to have a stricture of the urethra, he should be requested to pass his water before the surgeon, that the size and form of the stream, as well as the time occupied in emptying the bladder, may be correctly ascertained. A soft bougie, of the size of the

stream, should then be selected, which should be warmed by drawing it a few times through the hand; then having been properly curved to the shape of the urethra, it should be gently passed through the stricture. If, however, this be found impracticable, instruments of less size should be tried, until the one selected should prove small enough to pass through the contraction, without much pressure. In cases in which it is found impossible to pass a bougie of the smallest size, success will sometimes be obtained with a small silver catheter or sound.

The following observations of Mr. Shaw, when describing the natural impediments of the canal, should, however, be borne in mind. "If to these," he remarks, "we add the difficulty occasioned by the contraction of the muscles which surround this part of the urethra (the bulbous), and which is always excited by a slight inflammation of the membrane, we shall understand how the spasmodic affection which comes on the moment a bougie touches the inflamed part, combined with what I have called the mechanical difficulties, may produce so complete an obstruction to the entry of an instrument, as to give rise to the idea of the presence of stricture.

"When a bougie is obstructed at the bulb, its upper surface may be so cut or indented, by being pressed against the lower edge of the ligament, as to have exactly the same appearance as that which has been considered as an unequivocal proof of there being a stricture at the point where the instrument has been stopped."

If the symptoms of the urethral contraction be well marked, and the bougie meet with obstruction, we may be nearly certain that the disease is stricture. If, however, the patient says that he sometimes voids his urine in a good stream, the surgeon should not rest satisfied until he has made an examination of the urethra with a full-sized metallic sound. Indeed, this procedure should be adopted in all cases in which the contraction does not appear to be considerable, as it will frequently prevent an erroneous opinion being entertained of the existence of a permanent stricture, for a solid metallic instrument will often pass when the plaster bougie cannot readily be introduced, as the latter may have either lost its proper curve, become entangled in one of the lacunæ, or it may have been arrested by spasm.

A bougie, if of small size, may appear to have entered the bladder, when, in reality, it has not passed the stricture; but the

mistake is discovered when the instrument is withdrawn, for it will either be doubled upon itself, or twisted like a corkscrew. When introducing a bougie, it will be well to bear in mind, that the opening of a stricture is not always in its centre, and that it may be necessary to vary the point of the instrument.

Bougies, and other dilating instruments, appear to act beneficially upon a stricture: firstly, by enlarging the passage through it, consequently diminishing the irritation caused by the pressure of the urine; secondly, by lessening the morbid sensibility, inflammation, or congestion of the lining membrane at the seat of disease; thirdly, by effecting absorption of the morbid tissue. These effects, with the exception of the latter, appear evident, from the decrease of pain usually attendant upon each successive introduction of the bougie, and by the gradual restoration of the urethra to its healthy calibre. Surely, the circumstance of the pain becoming less on each succeeding introduction of the bougie, tells against the supposition that it is by causing inflammatory softening and subsequent absorption of the stricture tissues, its good effects are produced. I cannot but think, that whenever inflammation of a stricture is either caused or increased by the introduction of dilating instruments, but little good is ever effected by them, and that, in general, such inflammation rather retards the patient's progress towards recovery. The mucous membrane at the seat of stricture, being frequently in a state of congestion or chronic inflammation, it is probable that the relief afforded by the bougie, may in part result from the gentle pressure which it exerts upon the morbid tissue. The good effects produced by compression upon other parts affected with congestion are well known.

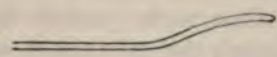
With regard to the absorbent powers of the bougie, the fact that parts formed by disease are more readily absorbed than are the healthy tissues of the body, has been confidently adduced in support of their views by those who believe that the pressure exerted by dilating instruments upon the obstruction, is capable of effecting its complete absorption. That such is the effect of the bougie in many cases, I believe, especially in the earlier stages of stricture, any time probably before the disease has undergone the fibroid transformation. I question whether any degree of pressure that can be safely made with a dilating instrument, will have the effect of causing absorption of that fibroid or semi-cartilaginous tissue, which constitutes many strictures. My belief is, that in the

great majority of urethral contractions of long standing, the action of the bougie is much more mechanical than vital; were it otherwise, when the use of the instrument is discontinued there would not be that tendency to recontraction which is admitted by every one conversant with the subject. When there is difficulty in finding the opening of a stricture, the model bougie is sometimes useful. One of middle size is commonly employed, and being well oiled is passed down to the obstruction, against which it should be steadily pressed for two or three minutes. When withdrawn there may be one or more projections at the point of the bougie, indicating the beginning of the true passage, and probably of one or more false ones, should such exist. When there are two or more projections, in general, the upper will be the impression of the true, and the lower, of the false channel which is usually made in that direction.

In the excellent treatise on "The Diseases of the Urinary Organs," by Dr. Gross, Professor of Surgery in the Louisville University, which I have read with much pleasure and instruction, it is stated that Professor Bigelow, of Havard University, has particularly recommended the use of gutta-percha bougies for taking an impression of strictures. He uses a middle-sized bougie of that material, well oiled, first passing it to and fro in the edge of a candle until it is warm enough to be impressed by the finger nail. The bougie is then to be passed quickly down to the stricture, against which it is to be pressed for a minute with a force equivalent to the weight of one or two ounces, and then left in the part triple that space of time to cool, when being slowly withdrawn, it will present an exact representation of the inequalities of the face of the obstruction. The gutta percha should be pure and no warm water employed in its preparation, otherwise the steam given off by it is apt to soften the bougie for several inches, causing it sometimes to curl up against the stricture. I have tried this model bougie and found it to answer its purpose very well. In difficult cases, M. Leroy d'Etiolles strongly recommends the employment of bougies with their ends twisted in different ways, by which means it appears he has been successful in their introduction after frequent failures with those instruments as commonly shaped. The following passage relating to this subject is extracted from M. Leroy d'Etiolles's work on Stricture, "*La bougie tortilleé.*—Pour introduire la bougie tortilleé il n'est pas nécessaire de lui imprimer un mouvement de rotation, il faut la présenter

très doucement au rétrécissement; si elle bute, on la rétire d'un centimètre environ, on lui fait exécuter un quart de cercle, et de nouveau on la fait cheminer; le passage lui est, il réfuse encore, on la rétire une seconde fois, elle reçoit un léger mouvement de rotation d'un autre quart de cercle, puis elle pousée en avant; sa pointe est présentée successivement ainsi dans toutes les sinuosités de l'angustie."

Sir B. Brodie observes, that in cases of retention of urine, when "the straight catgut bougie cannot be passed, we shall often succeed in effecting its introduction by bending the point of it, thus, which contrivance enables us to keep the point sliding against



the upper surface of the urethra, avoiding the lower part, in which the obstruction is always most perceptible, and in which the bougie is most likely to become, as it were, entangled."

There is another method of effecting dilatation, termed "special," which requires some notice. Special instruments of various kinds have been invented for the purpose of accomplishing the dilatation of a stricture more promptly than is practicable with those in ordinary use. We have had dilators of water, of mercury, and of air: of these the only one which has particularly excited attention in this country is that of Dr. Arnott, who has strongly recommended a dilator of his invention, made of a tube of varnished silk, which is to be passed into the stricture, and then inflated by air, forced into it with a syringe. This dilator is, of course, only suitable when an instrument of moderate size can be passed into the obstruction, in which case I believe that bougies and sounds will be found preferable, as the action of the latter can be regulated with greater precision than the former. Dr. Arnott considers that his method possesses the advantage of dilating a stricture to any extent without irritating the healthy portion of the urethra. It appears to me, that no good effect will be produced by stretching the strictured part beyond the healthy calibre of the urethra; and usually, the careful introduction of a bougie, at proper intervals, most assuredly diminishes, rather than increases, the natural irritability of the canal. Steel instruments, of peculiar construction, have been invented, which, having been passed into a stricture, the different branches of which their vesical end is composed, by

means of a screw, or other contrivance, are made to expand within the obstruction. All I have seen and heard of these dilators inclines me to the belief that, in most hands, they are much more likely to be injurious than beneficial.

There are two other modes of effecting prompt dilatation, which I must not omit to notice, those of Mr. T. Wakley and of Mr. Holt. The ingenious instruments bearing Mr. Wakley's name, consist of a series of graduated silver tubes, of eight different sizes, and the same number of elastic ones, the latter composed of flexible metal covered with elastic gum fabric. The first process in this method of dilatation is the introduction of a small No. 3 silver catheter into the bladder, as a director for the tubes of the same material, which are then to be pushed in succession over the directing catheter through the stricture, their size being increased at the discretion of the surgeon. The advantage thus gained, we are informed, can be preserved by substituting for the silver instrument one of the elastic tubes, which, having been pushed forward into the bladder, is to be retained as long as may be thought proper.

Mr. Holt's dilator is a modification of Perévé's instrument. It may be briefly described as a steel rod, No. 3 in size, and shaped like a catheter; it is divided transversely into two branches, which, when the instrument is introduced into the bladder, are kept accurately together by a screw fixed close to the handle of the dilator. There are six metallic tubes of different sizes. By loosening the screw after the introduction of the instrument into the bladder, the branches are easily separated to the desired extent, by pushing between them the tubes along a small guiding wire placed there for that purpose. The small wire guide for the tubes is, I believe, an improvement on Perévé's instrument.

It will be seen that, previous to the use of either of these dilators, it is necessary to introduce into the bladder a No. 3 silver catheter, or steel director, so that these instruments are, in fact, available only after the greatest difficulty in a bad case of stricture, that of getting a small catheter into the bladder, has been surmounted; they are therefore useless in the treatment of the worst and most embarrassing forms of stricture, called impassable, from their remaining long impermeable to instruments in the hands of the generality of surgeons.

When rapid dilatation is desirable—as, for instance, it may be in

the complication of urethral obstruction with vesical calculus—these dilators, in good hands, are likely to prove of great service. From the strong testimony in their favour brought forward by Messrs. Wakley and Holt, it cannot be doubted that there are many cases in which these dilators may be used with the greatest advantage to the patient.

The only remarks which, from my own very limited experience in the use of these dilators, I feel authorized to make with regard to their employment, is, that, from the great power and complete command obtained by them over the urethra, they should always be used with the caution so strongly recommended by their inventors. Some surgeons of repute have advocated the practice of forcible and rapid dilatation of strictures by the introduction, in succession, of several graduated instruments, until full dilatation is accomplished. In a few instances of intractable strictures, when the deeper-seated urethral tissues are not affected, the obstruction consisting merely of a ridge of thickened mucous membrane, it is possible that a cure may be obtained by forcible dilatation. We were, indeed, informed by the late Mr. Guthrie, that some of the best cures he had effected in urethral obstructions was when he felt the edge of the stricture caught upon and yield to the point of the dilating instrument. These cases should, however, be regarded as exceptions to the common course of events in such matters, instances of unusual good fortune, and not as precedents justifying forcible dilatation, which generally is highly injurious.

There is a plan of effecting dilatation in difficult cases of stricture, which has been very successfully employed, and strongly recommended by Sir Benjamin Brodie. The instrument which he uses is a silver sound with a wooden handle, rather above than below the middle size. The instrument which he generally uses has only a moderate curvature, and is nine inches in length, from the handle to the point; no part of it being more than one-fifth part of an inch in diameter, and the point only a sixth of an inch. The directions given for its use are the following:—"In using the sound you should pass it carefully as far as the stricture, and then press the point firmly against it, taking care that it is directed in the line of the urethra towards the bladder. The pressure is to be continued for five, ten, or fifteen minutes, or even longer, according to circumstances; and this process is to be repeated once in two or three days. If a false passage exist, it is probably on

the lower part of the urethra, towards the perineum, and it is especially in this situation that, by careless management, one may be easily made. To avoid this mischief, you must direct the point of the sound towards the upper part of the stricture next the pubes. The pressure should be as much as can be made without the urethra being lacerated, and without inducing any considerable degree of pain. In some instances the stricture has little or no sensibility, in others it is exquisitely tender; and in the latter cases the pressure should be very trifling at first, but it may be gradually increased as the tenderness subsides (as it will do) under its influence. The result of this treatment is, that at each operation the anterior part of the stricture seems to become relaxed to a greater or less extent; and that at last the instrument penetrates entirely through it, and enters the bladder. The period at which this happens, of course, varies in different cases."

I have adopted this method of Sir Benjamin Brodie's with advantage in cases where there are false passages. When, however, the obstruction has been hard, and of considerable extent, and the advance of the instrument has been slow after it has well entered the stricture, the employment of potassa fusa has appeared to me to have much facilitated dilatation. I have used the solid silver sound as recommended by Sir B. Brodie, but have had it graduated to within three inches of its point, so that the progressive advancement of the instrument can be accurately ascertained.

For further information regarding the dilatation of different forms of urethral contraction, I must refer the reader to the chapters on the "Treatment of the different kinds of Stricture."

Whatever may be the mode of treatment employed, the object of the surgeon must be to restore the strictured portion of the urethra to its normal size; he should, therefore, never be satisfied, until complete dilatation, whenever practicable, has been effected.

The degree to which dilatation should be carried, must be regulated by the size of the urethral orifice, which, in the healthy state of the canal, being its smallest part, whatever instrument it will admit without uneasy distension, will pass forward with facility into the bladder.

II. ON PERMANENT DILATATION BY RETENTION OF THE CATHETER OR BOUGIE.

This method of cure was much practised, as well as strongly recommended, by the late Baron Dupuytren, and was considered by him to be of two kinds: the first, or "vital dilatation," he had recourse to in every case in which no instrument could be made by a moderate and safe degree of force to enter the stricture, except in an emergency where, from continued retention of urine, a few hours' delay might prove fatal. The instrument preferred by the Baron for this dilatation, was a gum elastic bougie of medium size, of sufficient length to reach the obstruction, and to project about an inch from the orifice of the urethra. The bougie having been introduced, was fixed in the urethra by the usual means, so as to keep up a gentle pressure against the face of the stricture, the dilatation being facilitated, it was supposed, by turning the instrument from time to time in the canal. Dupuytren states, in his "Leçons Orales," that, often in a few hours, and in less fortunate cases, in a few days, by this method, the obstruction of the urethra will be overcome without difficulty, laceration, or discharge of blood. The action of the bougie when used in this manner was considered by the Baron to be of two kinds, its first effect being the removal of spasm; for, however firmly the instrument may be grasped on its introduction, in a short time it will admit of being freely moved in the urethra. Secondly, after retention of the bougie for a few hours in the urethra, a more or less abundant discharge of mucus, or muco-purulent matter occurs. Under the influence of these two phenomena, the removal of spasm and free urethral discharge, the stricture becomes dilated, in some cases quickly, in others more slowly. The dilating power of the bougie when retained against the face of a stricture, was accidentally discovered by Dupuytren in the case of a gentleman of extremely nervous temperament, who was suffering from retention of urine, caused by an impassable obstruction. This gentleman was so alarmed at the idea of the introduction of an instrument into the urethra, that it required much persuasion to induce him to submit to the operation. Dupuytren having at length succeeded in introducing a small bougie as far as the stricture, but without being able to get the point of the instrument into the obstruction, and wishing to make a further trial in the course of a few hours, determined to fix it in its position,

fearing that if it were withdrawn, the patient might not submit to its re-introduction.

On his return in a few hours' time, he found that the gentleman had passed some urine by the side of the bougie, which could now be readily engaged in the stricture. The bougie gradually advanced, and at the end of twenty-four hours was passed into the bladder. Complete dilatation of the obstruction was effected by the retention of catheters, their size having been gradually increased. The value of the discovery was fully appreciated by this sagacious surgeon, and the method of relief thus accidentally made known was afterwards successfully adopted by him in most cases of impassable stricture.

In cases where the point of the bougie could be made to enter a stricture, so as to be engaged in its grasp, Dupuytren fixed and retained it in that position, the bougie usually employed being a gum elastic one, tapering gradually towards its point. The instrument thus fixed within the obstruction, sooner or later caused its dilatation. A sufficient length of the bougie was left projecting, to admit of its being gradually advanced by the hand of the patient or surgeon, as the dilatation proceeded. The bougie was retained in the urethra until it could be made to enter the bladder, when it was changed for a gum elastic catheter, complete dilatation being effected by the latter. This was called by Dupuytren, "mechanical dilatation," and he compared the operation of the bougie to that of a wedge. The urethra, however, being a living part, the action of the bougie, although, perhaps, principally mechanical, must have been also partly vital.

Dupuytren availed himself of his discovery of vital dilatation in the treatment of impassable strictures, and from that time ceased to employ force to overcome them by the method which had been previously adopted by Dessault at the Hôtel Dieu.

Dupuytren strongly condemns the employment of force, and states that in ten individuals in whom that practice was adopted, half of them experienced lacerations of the urethra, swellings of the penis, and infiltrations of urine, the result having been occasionally fatal. His concluding observations on dilatation of the urethra cannot be too forcibly impressed on the mind of every surgeon who follows the practice recommended. The gist of these observations is, that whenever an instrument of the smallest calibre can be passed through a stricture, it will be possible in ten or twelve days to dilate the canal to its full size; yet such rapid dilatation is never

desirable, as it is often followed by very severe consequences. He observes, that the tissues forming strictures possess an extensibility, the bounds of which can scarcely be passed without causing laceration, and even destructive inflammation. The dilatation should therefore be very slowly effected.

In the greater number of Dupuytren's cases, the dilatation was only temporary, the strictures having had a tendency to return. He consequently strongly enforces the necessity of the use of bougies for some length of time afterwards, gradually extending the interval of their introduction. The practice of vital dilatation, by fixing a round-pointed hollow elastic gum bougie of medium size against an impassable stricture, has also been strongly recommended by the late Mr. Guthrie, and was successfully adopted by him in several instances before he knew that Dupuytren had long been pursuing a similar plan of treatment. Mr. Guthrie observes, that "the continued presence of a bougie against a stricture, instead of increasing irritation, has the directly contrary effect; and that, after it has been retained a few hours, if a patient becomes sensible of any difference, it is that his water passes more freely than before." Mr. Guthrie inculcates the necessity of effecting the dilatation slowly, observing, that "the greatest evils arise from increasing the size of a bougie too rapidly." He also enforces the necessity of continuing for a long time the introduction of the bougie.

Dilatation of strictures by retention of the catheter is much practised by French surgeons, but has never been a favourite method of proceeding with English practitioners. The truth is, that in France this mode of treatment does not appear to cause so much irritation as in our own country.

The pain and irritation, often of a severe character, which so commonly occur in this country during the dilatation of strictures by retention of the catheter, are, indeed, sufficient reasons in themselves for the practice being adopted only under peculiar circumstances, and not as a matter of choice. Another good and sufficient reason, however, for the non-selection of this method is, that the more quickly the dilatation of a stricture is effected, the greater is its liability to return, a well-known fact illustrative of the old proverb, "The greater haste, the less speed." To these reasons may be added, the necessary confinement of the patient to his room during the process of dilatation, which, although last mentioned, is not, perhaps, the least influential of the causes

assigned for the preference of English surgeons to the treatment by the bougie. There are, however, special occasions in which retention of the catheter proves a most valuable auxiliary in the treatment of stricture. The first case in which we may be desirous to avail ourselves of this mode of treatment, will very probably be retention of urine, the result of long-continued stricture, in which the patient's sufferings from a distended bladder will, perhaps, be most acute. It may happen, that by persevering and gentle attempts we shall at length be successful in getting a No. 2 catheter into the bladder, thus, perhaps, relieving the patient from a state of almost indescribable agony. In this instance, there can be no doubt of the propriety of retaining the catheter in the bladder, whether it be one of silver or of elastic gum; but if the latter, so much the better, as it is less likely to cause irritation. The instrument should be plugged up, and the patient can remove the plug whenever he desire to pass his water. Most probably, in the course of two or three days, sooner or later, the instrument will be so loose in the urethra, that it may be easily replaced by one of larger size, and perhaps the complete dilatation of the stricture may be effected by continued retention of the catheter, should no great irritation ensue from its presence. In my own practice, however, if there are no false passages or disposition to rigors, as soon as the obstruction will admit of a No. 7 or 8, I prefer gradually accomplishing the remaining dilatation with the bougie, and perhaps an occasional mild application of the potassa fusa. The reason for retention of the catheter, in this instance, is obvious; for should the instrument have been withdrawn soon after evacuation of the bladder, it is possible that the next attempt to introduce it, which would probably soon have been required, might not have been attended with the same success.

In old hard strictures, especially when long and irregular, the occasional retention of a catheter for a day or two, will sometimes facilitate their subsequent dilatation.

Another instance in which the treatment by retention of the catheter will be of great value, and should, if possible, be adopted, is where there is one or more false passages. It often happens, that in such a case no slight difficulty is experienced in getting an instrument through the natural channel into the bladder. Here, if once successful in our object, but little farther skill will be required, if the catheter be retained, and when loose,

replaced by one of larger size, taking care slowly and cautiously to complete the dilatation by the same means. The treatment by retention of the catheter has been strongly recommended by Sir B. Brodie, in cases of highly irritable strictures, in which rigors, commonly succeeded by considerable constitutional disturbance, are of frequent occurrence after the introduction of instruments, and in which often but little progress can be made with the bougie. Sir B. Brodie was led to the adoption and recommendation of this plan on discovering the cause of these rigors to be the passage of the urine over the strictured portion of the mucous membrane which had been rendered more irritable by the bougie. In many similar cases, however, I have succeeded in removing the irritability of the strictures by a few applications of the potassa fusa, after which the obstruction has yielded to the common bougie. In some persons, the continued presence of a catheter in the urethra causes so much irritation and subsequent inflammation, that the treatment cannot be judiciously pursued. In such cases, where rigors are apt to occur, from the passage of the urine after the use of the bougie, their occurrence may often be prevented by relieving the bladder, when required, by the introduction of a small gum-elastic catheter without its stilet, the patient having been, of course, desired not to pass his water. As the stricture becomes dilated, the introduction of the catheter will probably not long be required.

It is proper, however, here to observe, that by keeping patients under the influence of opium a little before and after the introduction of instruments, the occurrence of rigors will often be prevented. In cases of extravasation of urine, whether from ulceration or accidental rupture of the urethra, a catheter should, if practicable, be passed into the bladder and retained. In strictures highly predisposed to spasm, in which a bougie may be strongly grasped for some length of time, the retention of a catheter for a few hours will often be of great service. In some persons, however, retention of a catheter in the bladder causes so much irritation of that organ as to render its presence almost insupportable; and a patient, under such circumstances, will often withdraw the instrument himself, regardless of the result. In such cases our object can often be obtained by withdrawing the catheter a little way out of the bladder; an inch will probably be sufficient. It must be fixed in that position; and whenever the patient requires to pass his water, the instrument should be gently pressed forward for that purpose.

There can be no doubt that vital dilatation may be sometimes advantageously practised on patients whose time is at their own disposal; but, in cases where this plan appeared to me to be applicable, I have usually preferred the treatment by potassa fusa. If, however, the potash had proved unsuccessful, and no urgent symptoms been present, requiring more immediate removal of the obstruction, I should certainly have made trial of vital dilatation before resorting to division of the stricture. The late Mr. Guthrie, who had much experience of this method of treatment, informs us, in his work on "The Anatomy and Diseases of the Urinary and Sexual Organs," that he had been successful with it in overcoming the obstruction when not of any great extent. He has related some interesting cases in illustration of this treatment.

The treatment of stricture by vital or mechanical dilatation will require much attention on the part of the surgeon, and self-denial on that of the patient. If the latter be prudent, live rather low, and abstain entirely from fermented liquors, the surgeon may perhaps slowly effect complete dilatation of the obstruction with but very little medical treatment beyond the exhibition of an opiate every night at bedtime, followed by a dose of castor-oil in the morning. These precautions will, in most cases, be successful in keeping within safe bounds the irritation resulting from continued retention of instruments in the urethra. In some cases, however, so much inflammation of the mucous membrane of the urethra and its adjacent textures will ensue, the mischief probably extending to the bladder, that this treatment must be given up, at all events, for some little time, if not entirely abandoned. Whenever this practice is pursued, it will be a great relief to the patient if the catheter or bougie be occasionally withdrawn, and the urethra left quiet for a day or two, or even for a few hours. This can, I think, generally be done without interfering with the ultimate success of the treatment.

The error, I believe, most likely to be committed in this mode of treating strictures, is that of increasing the size of the catheter or bougie too quickly, an error which should be especially guarded against, as nothing is more apt to cause mischief than over-distension of tissues, which are in these cases more or less irritable and inflamed. Besides, the fact previously stated should always be remembered, viz., that strictures quickly dilated are

more likely to return than when dilatation has been more slowly accomplished.

I believe it will seldom be advisable, in this mode of treatment, to increase the size of the catheter until the one previously retained be found to lie rather loosely in the urethra. If, when tightly grasped, it be replaced by a larger instrument, the urethral irritation which is almost certain to follow, will, in nine cases out of ten, prove injurious instead of beneficial to the patient.

The result of my experience with regard to this method of treatment, may be briefly stated in the following summary observations :—1st, That it should only be had recourse to as a palliative measure in some cases of emergency, and that the sooner it can be prudently discontinued for the employment of temporary dilatation, the better will it be for the patient ; 2nd, That the treatment by retention of the catheter has no pretence to be considered as a permanent cure for urethral stricture, and, in nine cases out of ten, I believe, that unless very great care be taken in watching the patient, and removing the catheter occasionally, more harm than good will be the result.

The treatment by continued retention of the catheter has, I must confess, in my own practice, very greatly disappointed me, as the laudatory terms in which it has been frequently mentioned by writers on Urethral Surgery had led me to entertain a high opinion of its efficacy. We have been confidently told, that by the continued retention of a catheter in the urethra for the space of three or four weeks, old hard strictures become completely absorbed, leaving the canal free from disease. It certainly has not been my good fortune to meet with such a result. On the contrary, I have but too frequently found that a stricture has become more intractable to the bougie after, than previous to, this method of treatment. To be rightly estimated, it should be regarded simply as a valuable resource in cases of emergency, but one which should never be lightly adopted ; and which, as a general rule, should be discontinued as soon as the cessation of the urgent circumstances of the case render the retention of an instrument no longer necessary.

Let it be distinctly understood, however, that the preceding observations are applicable only to the continued retention of the catheter, and not to that modification of the plan, which consists in

restricting the period of the retention of the instrument to a few hours instead of days.

This modified plan I have found highly serviceable in many of the more unyielding forms of urethral contraction. The time which I usually permit the catheter to be retained at any one period, is, of course, regulated by the irritability of the urethra in each particular case; seldom, however, exceeding a period of from twelve to twenty-four hours, or two days at the utmost.

As this treatment of stricture by permanent dilatation has been much more practised in France than in this country, it may be useful to state the opinions of its efficacy entertained by French surgeons of great experience in Urethral Surgery.

In Civiale's "Practical Treatise on the Diseases of the Genito-Urinary Organs," are the following observations relating to "slow permanent dilatation:"—"When the flexible catheter has remained from four to six days in the urethra, it becomes more and more free, and a part of the urine passes between it and the canal, especially when the bladder is hypertrophied. It is then proper to replace it with one of larger size. The catheter should be renewed every six days. That which replaces the one previously retained should be increased in size half a millimètre (*demi-millimètre*), and thus proceeding by degrees, an instrument of full-sized calibre will be attained, which is from eight to nine millimètres. In many cases the treatment can be conducted with more celerity; but then the cure is less sustained, and the patient finds himself exposed to accidents which can be almost always avoided by a slower proceeding." The ill effects sometimes caused by retention of the catheter are thus described by Civiale:—"At the end of some days the catheter excites inflammation of the mucous urethral membrane, accompanied by a discharge, sometimes copious. This inflammation may be sufficiently intense to produce local disorders, such as redness, swelling, and pain of the urethra, and probably of the neighbouring tissues; the inflammation sometimes extending to the spermatic cords and testicles. Sometimes abscesses are formed along the canal; or even gangrene, which is happily rare." Such was the case cited by Lallemande: it occurred to a patient in whose urethra Delpech had placed and retained a catheter for the cure of a stricture; on the twentieth day a gangrenous inflammation supervened, which destroyed the whole of the scrotum. M. Rayer, in his "Traité des Maladies des Reins," speaks of a man "who could not micturate without the assistance of the catheter. During some

time he was catheterised many times in the day; but at length the catheter was retained. He soon died, and on *post-mortem* examination there was observed an oblong ulceration with blackish edges occupying the inferior surface of the urethra, commencing at the bulb, and extending forwards to the length of about six millimètres. In all this extent the parietes of the inferior surface of the canal had been completely destroyed. The gangrene," says the author, "corresponded to the point where the compression of the catheter had been the strongest."

Civiale does not consider this method of any utility in cases of urethral stricture complicated with fistulæ; as he found that the retention of the catheter does not prevent the escape of urine through the fistulous openings, as the urine will pass by the sides of the catheter. Civiale's experience in this matter corresponds with that of Sir B. Brodie, in whose lectures will be found the following valuable practical remarks upon the use of the catheter in the complication of stricture with fistulous openings:—"I formerly have advised the patient never to void his urine without the aid of the catheter; but I am now inclined to believe that the irritation thus kept up tends, on the whole, to delay rather than expedite the cure. At other times, I have kept the patient in bed for some weeks with an elastic-gum catheter constantly in the urethra and bladder; but I cannot say, with my present experience, I have much more faith in this method of treatment than that which I have just mentioned. After a few days, the urine generally begins to flow by the side of the catheter, which does not, therefore, answer the purpose for which it was introduced, of preventing its escape by the sinus. Then, in many cases, the catheter has the effect of a seton, causing an abundant suppuration of the urethra; and the purulent discharge, finding its way into the sinus, prevents it from closing as much as it would be prevented by the contact of urine."

Leroy d'Etiolles says, that in permanent dilatation three rules should be observed — "The first, never to increase the size of the dilating instrument before the stricture becomes somewhat softened and relaxed, which will generally be the case in from twenty-four to thirty-six hours. If this rule be not acted upon, so much urethral reaction and irritation may occur as to compromise the success of the treatment. The second rule is to suspend the treatment by withdrawing the catheter as soon as micturition becomes frequent and painful, whilst the urine contains a mucous

deposit streaked with blood, to which is added febrile disturbance of the system. Third rule: when dilatation is completed, a few days' rest should be allowed, after which, the last three numbers used should be introduced and retained for half an hour daily."

AMUSSAT'S METHOD OF TREATMENT BY FORCIBLE INJECTION—"INJECTIONS FORCÉES."

Amussat was led to the use of these injections from the knowledge that the urethral canal is never entirely obliterated; and that complete retention in persons affected with stricture, is commonly caused by the opening of the stricture being blocked up by a plug of inspissated mucus, and which usually precedes the first jet of urine. He thought that in these cases, where an instrument cannot be passed through the stricture, it would be always possible to introduce, from before backwards, a liquid which by its fluidity would insinuate itself more easily than a solid body into the opening of the contraction, and so relieving the retention without the least danger, by forcing back the plug of mucus which intercepted the passage of the urine. The value of this method was proved by numerous instances of its successful results in cases of retention from stricture, constituting, to use the words of Amussat, "a means simple, easy, and sure in its mode of application."

Manner of practising the injections.—The patient being seated on the edge of his bed, the legs supported by two assistants, or resting on chairs, the surgeon introduces into the urethra as far as the stricture a flexible gum-elastic catheter of small diameter, open at both ends. He adapts to this catheter a gum-elastic syringe which has been previously filled with warm water. The syphon of the syringe should have an almost capillary opening. All being thus prepared, the surgeon presses firmly the urethra upon the catheter with the index and middle fingers of the left hand, whilst with the right he gradually compresses the syringe to force out the liquid which it contains. This being prevented escaping from the urethra, in consequence of the pressure exercised on the canal, soon penetrates into the opening of the stricture, and pushes back the mucus which blocks it up.

As the injection is pushed forward, if the patient be desired to make efforts to micturate, it will seldom happen that he is not immediately relieved; as soon, in fact, as the urine has gone

beyond the obstacle. The urine passes in drops, and when the catheter is withdrawn, provided the patient retains his power of expelling the contents of his bladder, it escapes in little jets. It may happen, especially in elderly persons, that a first injection does not succeed; a second must then be tried, and even a third, should it be necessary. When, after the cessation of the retention, injections are used as a means of dilatation, they may cause in irritable and nervous subjects a febrile disposition; if so, this fever will soon subside by the use of some warm baths, and the application of a few leeches to the perineum. The resistance which the obstruction opposes to the passage of the injection is sometimes so great, that the force exerted by the hand is insufficient, and the surgeon is obliged to place the hand which presses the syringe between his knees, to compress it more forcibly, and by jerks. A fear has been entertained by some practitioners, that this injection of water would only be adding to the distension of the bladder; but the quantity of liquid which is injected is so small as to be quite innocuous; for, in clearing the obstacle, it is met by the column of urine for which it is opening a passage.

Since the year 1824, when Amussat first had recourse to forced injections, he has very frequently used them, and experience has enabled him to establish the following propositions:—"1. When the patient preserves his full strength, the injections suffice for the entire evacuation of the urine contained in the bladder, without the necessity of resorting to catheterism, and the introduction of bougies. 2. In old men and weak subjects, injections relieve the most urgent symptoms (*les premiers accidens*) of retention, and render subsequent catheterism and the introduction of bougies much easier. 3. In cases in which a false passage has been made, injection is always the surest means of opening for the urine its natural passage. 4. Whatever may be the cause of the retention, the injections are always useful, since, in cases where they are insufficient for the complete relief of the patient, they invariably facilitate the introduction of instruments, rendering their use less painful. 5. Whenever the patient preserves a sufficient degree of strength (*assez de force*), they render unnecessary the puncture of the bladder—an operation always serious, and sometimes mortal. 6. Not only do forced injections relieve the retention of urine, but they suffice often for its prevention, in individuals who have the urethral canal so much contracted as to prevent the introduction of sounds or bougies." Some cases of retention of urine, in which

no instruments could be passed, and which were relieved by injections, are related by Amussat, in illustration of the advantages of the treatment by "forced injections." "A method," he observes, "which is little known to the majority of surgeons, constituting one of the most sure and efficacious means for the relief of retention of urine caused by urethral stricture."

On the use of forced injections in facilitating dilatation, Amussat observes: "It often happens that the most skilful surgeon is unable to introduce the finest bougie through the stricture; it is then that forced injections are of great assistance. Their action is so evident and prompt, that a single trial will convince us. Let the patient micturate in a glass, before using the injection, and then mark the time which he takes to fill it. After the injection, the stream of urine will be stronger and larger, whilst less time is occupied to fill the glass."—*Opus cit.*

In concluding these observations upon the treatment of urethral stricture by dilatation, whilst acknowledging their inadequacy to afford information sufficient to meet the exigencies of every case, I trust that they may be found of some practical utility. It appears to me, that it would be an almost hopeless, if not impossible task, to attempt to prescribe such general rules as would be applicable to the infinite varieties of strictures diversified by individual peculiarities of constitution, and consequently requiring some modifications in their management. No man can possibly predict, precisely, what any urethra will bear with safety until he has fairly tried its temper.

Although slight strictures of the urethra may occasionally disappear on the subsidence of the inflammation which caused them, without the introduction of instruments, yet, certainly, their usual course is gradually to increase, unless proper means be adopted for their removal. When once a stricture is fairly established, by a thickening of some part of the urethra, its tendency to increase is in a great degree explained by the irritation caused by the frequent pressure of the urine against the contraction becoming greater as the obstruction advances, from the additional power exerted by the bladder to enable it to force its contents through the gradually progressive narrowing of the urethral channel. The sexual functions performed by the urethra, subjecting it to frequent determination of blood to the part, must also add to any irritation existing in that canal.

In those instances in which the urethra has given way from ulceration, leading to the formation of urinary abscess, from the subsidence afterwards of the symptoms of the urethral obstruction, there has been every reason to suppose that the stricture itself must have been included in the ulcerative process. Sir B. Brodie, in his Lectures on the Urinary Organs, mentions a case in which he had good reason to conclude that a stricture was partly removed by ulceration, without the occurrence of abscess; but at the same time he observes, that "such a case is rare." We must therefore admit that nature unassisted by art, may, by the ulcerative process, in some few instances, effect a partial or a complete removal of what is called a permanent urethral stricture.

Stricture of the urethra, when fully established, and allowed to pursue its natural course, without surgical interference, must undoubtedly be regarded as tending more or less to the destruction of life; a fact, the mention of which, at the conclusion of these general observations, will, I hope, render them more useful by inducing early attention to a disease of such importance.

CHAPTER VIII.

AIDS TO DILATATION—CAUSTIC.

Although the treatment of urethral stricture by simple dilatation, when properly conducted, may afford sufficient relief in a large majority of cases, there are many aggravated forms of the disease in which it is totally inefficient. The most ardent advocate for restricting the treatment of urethral obstruction to simple dilatation, must, at all events, admit that, however satisfactory that proceeding may prove to the surgeon, there are many cases of stricture in which it will not be equally so to the patient, who, finding his life but a miserable prolongation of existence, will eagerly avail himself of any means which hold out some hope of further relief. In such cases, the sufferer must chiefly depend, for any considerable improvement in his condition, upon one of two methods—either the application of caustic to his stricture, or on its division by some cutting instrument. The ample evidence adduced in support of both these methods, must have fully satisfied every unprejudiced mind that each has proved highly useful in many instances. The difficulty is, the selection of the one most advantageous for the patient, which will, of course, depend upon the peculiarities of each individual case. Before adopting either, there are, however, some primary questions of no slight importance to be considered:—Are these methods equally free from danger? or, if none are without their perils, is one less hazardous than another? or, if more so, is the relief which the patient is likely to derive from that particular method, so superior to less perilous measures as to justify the risk of its adoption?

There is a very simple, and, as it appears to me, satisfactory manner of arriving at a decision on the proper means to be adopted. Let the surgeon imagine himself placed in the position of his patient, and do by him as he himself would be done

unto. With these preliminary observations, I now proceed to the consideration of the treatment of urethral contractions by escharotics, and by the knife. As experience has proved the inefficiency of these without the assistance of the bougie, or other dilating instrument, they can be properly regarded only as auxiliaries or promoters of dilatation, which is my reason for having placed them under that head.

In placing fairly before the profession the results of my experience of the method of treatment by *escharotics*, I can assure them that it is not from any hastily formed views upon this subject, from the attainment of success in a few instances, but from more than twenty-five years' observation of the good effects of caustic potash in bad cases of stricture, that my conclusions have been deduced.

The application of escharotics to urethral obstructions—to carnosities and callosities, as they were formerly termed—was practised many centuries ago. We are informed by Civiale, that the attention of French surgeons was first particularly directed to this method of treatment by Alphonse Ferri, whose work was not known before 1535. He employed first emollient injections, then bougies impregnated with verdigris, arsenic, and quick lime. From the ill effects often produced by this mode of cauterisation upon the healthy portions of the urethra, it was soon abandoned, and another proceeding adopted in its stead. In the new method, the caustic material was incorporated with the substance of the bougie. It appears that the composition of these escharotic bougies, which were in use for a long time, was always kept secret. We learn from Civiale, that some practitioners, Paré amongst others, employed caustics in a pulverised state, which they introduced into the urethra, and applied to the diseased part by means of a canula and of a metallic stiletto; it was in this manner that Loyseau treated Henry IV. for a stricture. This method had, it seems, no great success, and was soon given up, and recourse again had to the plaster escharotic bougies. The principal objection to their use was their liability to act on the healthy as well as the diseased parts of the urethra, causing hæmorrhage, retention of urine, induration of the urethral parietes, as well as general irritation.

Notwithstanding these occasional unfortunate results, the escharotic bougies continued to be more or less used in the treatment of urethral stricture, until they were superseded by the method of

cauterisation introduced by Mr. Hunter, whose European celebrity was sure to attract general attention to a plan of treatment stamped with his authority. The caustic used by Hunter was the nitrate of silver, which he introduced at the end of a conductor, through a canula, to the stricture, so as to destroy the urethral obstruction. Wiseman had, however, applied the nitrate of silver to urethral strictures before Hunter's time, and is supposed to have been the first English surgeon who employed this caustic in the treatment of stricture. The practice did not, however, become general until it was advocated by Hunter, who afterwards, instead of the conductor and canula, used the common bougie, having inserted in its point a piece of nitrate of silver, so well known as the "armed bougie."

In the following remarks from Mr. Hunter's "Treatise on the Venereal Disease," will be seen the result of his experience of the application of nitrate of silver to strictures:—"If the obstructions are anywhere between the membranous part of the urethra and glans, where the canal is nearly straight, or can easily be made so, it becomes an easy matter to destroy them by caustic; but if beyond that, it becomes then more difficult; however, at the beginning of the bend of the urethra, the obstruction may be so far removed as to admit of the passing of a bougie, or at least to procure a tolerably free passage for the urine. I have seen several cases where it was thought necessary to follow this practice, and it succeeded so well, that, after a few applications of the caustic, the bougie could be passed, which is all that is wanted. I look upon the caustic as a much safer method than using pressure with a bougie, on account of the danger of making a new passage without destroying, in the least, any part of the obstruction." In another passage, Mr. Hunter observes: "I have often tried this practice in strictures where there were also fistulæ in the urethra, and where the water came through different passages. Such cases are not the most favourable, yet I succeeded in the greater part of them; that is, I overcame the stricture, and could pass a bougie freely. I have seen several cases of fistula of these parts, where the natural passage was obliterated by the stricture, in which I have succeeded with the caustic, and the fistulous orifices have nearly healed."

Sir Everard Home, the successor and relative of Hunter, in his well-known work on Stricture, has strongly advocated the employment of lunar caustic. He not only used it in aggravated forms

of that disease, but indiscriminately in all urethral obstructions, with a boldness, and to an extent that frequently caused great suffering, such as rigors, retention of urine, and sometimes profuse hæmorrhage. Sir Everard Home's work on Stricture has, however, always appeared to me to be of great value; for, whilst the capabilities of the caustic in removing many bad forms of that disease are proved by a sufficient number of facts to convince all but the ultra-sceptical, its injurious effects are also stated with a candour well worthy of imitation.

It may be questioned if the powers of any remedial agent were ever more fully and severely tested than those of the nitrate of silver by that eminent surgeon.

That the treatment by caustic was frequently adopted by Sir Everard, in cases where the employment of milder measures would have been more judicious, and that it was pushed by him to an injurious extent, cannot be denied. That his recommendation of the employment of the nitrate of silver in all cases of permanent stricture, led, in many instances, to a fearful abuse of that remedy in the hands of others, must also be admitted. Mankind generally are apt to entertain extreme views; and because rigors, false passages, induration of the urethral tissues, and sometimes, debilitating hæmorrhages, were found to result from the caustic treatment, or rather its abuse, a really valuable means of cure in many cases of intractable stricture was soon abandoned by the generality of surgeons.

After the ample evidence of the powers of the nitrate of silver in removing many strictures that had previously been impermeable to the bougie, recorded by Hunter, whose truthfulness and accuracy of observation are unquestionable, besides the greater number of similar cases mentioned by Sir Everard, it is impossible for any unprejudiced mind to question the *capability* of caustic to destroy many obstinate forms of urethral obstruction.

I know that many excellent English surgeons have been in the habit of occasionally employing the nitrate of silver in bad cases of stricture, and often with successful results. Among others, it will be sufficient to mention the names of Bransby Cooper, Guthrie, Macilwain, and Phillips. Several cases treated with caustic will be found recorded in Mr. Bransby Cooper's cases of stricture in "Guy's Hospital Reports." Mr. Guthrie's observations upon this method of treatment are so much to the point as to induce me to insert them here. Mr. Guthrie, after having alluded to the pre-

judices which have long existed against the use of caustic in strictures, observes, "That, like most other prejudices, they have some foundation in truth; but it is the abuse of the argentum nitratum, and not the use of it, which has given rise to them. I honestly confess I dare not say to a stranger, whatever his case may be, and however successful a few applications of the caustic might be, that I mean to use it. I dare not do so until after a few visits, and we have more confidence in each other; perhaps, only after he sees that he does not make much progress. I should lose my patient if I did, who would go to another, and might be told that he had narrowly escaped the worst treatment in the world, an opinion he would not fail to repeat. Nevertheless, the argentum nitratum is a valuable remedy, when properly used, in appropriate cases, and not abused. At some future time, when the prejudice which has arisen against its use shall have passed away, it will again take its place, with other means, as a very effective remedy in certain forms of stricture." In the latter part of Sir Everard Home's work, the following passages occur:—"I have had numerous opportunities of knowing that no return of the symptoms has taken place in fifteen or twenty years, although no bougie had been used since the cure had been completed; and when the urethra was examined after death, the part in which the stricture had been, had the same smooth surface as the rest of the canal. *In cases of failures, from the strictured part having become so hard and thick as not to be destroyed by the nitrate of silver, it is to be regretted that we have not a more powerful caustic, capable of being applied to the urethra, since that is all that is required for their removal.*"

Of the effects of the nitrate of silver as a curative agent in urethral stricture, I have had personally but very little experience, having for a long time almost entirely given up its use in that disease. It is at present the fashion to decry this remedy, apparently for no other reason than its having often been applied to an injurious extent, and that it will not cure all cases of stricture. But what are the means devised by human skill, and dependent upon human judgment for their administration, that will not sometimes be abused, and fail in affording the desired relief? The most eminent surgeons have, in fact, been of late so prejudiced against the use of caustic in stricture of the urethra, that when consulted in aggravated cases where it has been used, they have unhesitatingly ascribed every untoward circumstance

which may have occurred during the treatment, to the effects of that remedy. I can truly say, however, that while I have witnessed some most severe effects from the too forcible introduction of instruments, no bad results have, in my own practice, followed the application of caustic. In so harassing a disease as stricture often proves, I think we are not justified in rejecting any safe remedy that has been found useful.

The only caustic, besides the nitrate of silver, at present used in the treatment of urethral stricture, is potassa fusa, which Mr. Whately has the merit of having been the first to employ in that disease. From some cause or other, notwithstanding the strong recommendation of Mr. Whately, this truly valuable caustic has been but little used in the treatment of stricture. Before giving the result of my own experience upon the curative powers of potassa fusa in stricture, I shall introduce some quotations from the work of Mr. Whately, entitled "An Improved Method of Treating Strictures in the Urethra." In that work are the following remarks:—"In every stricture, before we apply the potassa fusa, we ought to be able to pass a bougie into the bladder of at least a size larger than the finest kind. This is necessary to enable us to apply the caustic to the whole surface of the stricture, and likewise to put it into our power to remove a suppression of urine, should it occur during the use of the caustic. A small hole, about the sixteenth part of an inch deep, should be made at the extremity of the bougie, which should be just large enough to enter the stricture. A piece of broken caustic, half the size of the smallest pin's head, should be selected; the particle cannot indeed be too small for the first application. Let this be inserted into the hole of the bougie, and pushed down into it, so as to sink the caustic a very little below the margin of the hole. To prevent the kali from coming out, the hole should be contracted a little with the finger, and the remaining vacancy in it filled up with hog's lard.

"When the bougie has reached the anterior part of the stricture, it should rest there for a few seconds, that the caustic may begin to dissolve. It should then be pushed very gently about one-eighth of an inch, after which there should be another pause for a second or two. The bougie should then be carried forwards in the same gentle manner till it has got through the stricture. When the caustic bougie has passed through a stricture, it should be withdrawn to the part at which it was first made to rest, after

which it should be passed very slowly through the stricture a second time. If the patient complain of pain, the bougie should be immediately withdrawn; but if not, we may repeat the operation by passing and withdrawing the bougie through the stricture once or twice more. It is essential that the bougie pass through the stricture at each application of the caustic. We ought, therefore, to pass the bougie we intend to use once through the stricture before the kali is inserted into it. At the end of seven days the application may be repeated; and if the patient felt no degree of pain, a piece of kali a small degree larger than the first may be selected. The operation should be repeated till the contracted part of the urethra is dilated, if possible, to the natural size. We are, however, on no account, to increase the quantity of caustic as we increase the size of the bougie. I do not in any case apply more of the kali purum at a time than a piece about the size of a common pin's head. Twelve bits of the largest size weigh one grain. There are some cases in which the contraction is so irregular, and its aperture so untowardly situate, that a bougie cannot readily, if at all, be passed into it; others have likewise been described, in which it is impossible to pass a bougie through the stricture. If, in the former of these cases, a bougie with the kali cannot be passed into the stricture, or if it get through the stricture, and do not destroy the irregularity, and it becomes necessary to apply a caustic to the anterior part of the contraction, I should certainly prefer the lunar caustic to the kali purum."

Mr. Whately observes, "It would be difficult to weigh such small pieces of caustic. In order, therefore, to convey a clear idea of the different quantities to be used, I shall here represent them by three dots of different sizes, thus . . ."

From the result of no inconsiderable experience of the use of potassa fusa in many intractable forms of urethral obstruction which had resisted the ordinary means of treatment, nitrate of silver included, I am convinced that the excellent effects of the former caustic are but little known to the generality of surgeons. It was the inefficient and unsatisfactory action of nitrate of silver in old hard strictures, particularly such as were impermeable and of considerable extent, that first induced me to give the caustic potash a trial. I very soon became convinced of its superiority to nitrate of silver in such cases, having found that more good might be effected in the majority of gristly strictures by one application of potassa fusa than by several of nitrate of silver. I found also that,

to be effective in these cases, it was necessary to employ the caustic more freely than was recommended by Mr. Whately, and that this might be done with perfect safety.

Caustic potash, when properly applied to strictures of the urethra, causes a sensation of heat, not commonly of a painful description, except in such as are irritable, and then the pain is but slight, and of short duration. The property possessed by potassa fusa, of combining with oily substances and animal mucus, forming a saponaceous compound, modifies its action, and enables it to penetrate the hardened tissue of a stricture, to soften, and promote its absorption more effectually than the nitrate of silver.

Potassa fusa appears to me to act beneficially upon strictures, by relieving irritability and inflammation; by promoting absorption, and stimulating the congested vessels to contraction; also, by its dissolvent powers.

The caustic potash may be advantageously applied to strictures for two purposes:—one to allay irritation, the other to destroy the thickened tissue which forms the obstruction. When used in the minute quantity employed by Mr. Whately, I believe its action to be simply that of allaying irritation, as, when mixed with lard and oil, combined with the mucus of the urethra, it can scarcely have any effect beyond a mild solution of caustic, which most probably causes a more healthy state of the lining membrane of the stricture. Before using the potash, a bougie should be passed down to the stricture, that its distance from the orifice of the urethra may be correctly ascertained. A small piece of the caustic, about the size of a common pin's head to commence with, should be inserted into a hole made in the point of a soft bougie. The caustic should be broken just before it is required, and the inner or dark part selected, as the outer portion is usually less efficient, as it is commonly converted into a whitish crust of carbonate of potash. Two notches should be made in the armed bougie, as directed by Mr. Whately—one marking the exact distance of the stricture; the other, an inch beyond; so that its progress, as it enters the obstruction, may be accurately observed. The bougie should be moulded with the finger round the potassa fusa, so that it may be securely fixed; but to insure the action of the caustic, instead of being below the level of the hole of the instrument, as recommended by Mr. Whately, its points should be fairly exposed to enable it to act upon the stricture.

I have been particular in these directions from a conviction of

their necessity; for if Mr. Whately's injunctions regarding the method of using the potassa fusa be literally followed, and his exceedingly minute quantities of caustic be inserted below the level of the hole in the bougie with a covering of lard, I well know there can be no efficient action of the remedy upon the stricture, a fact of which any one may soon convince himself. It is evident that Mr. Whately, from his over-anxiety to prevent the abuse of this valuable caustic, has given such precautions for its employment, that if strictly obeyed, must render the remedy of little value.

The armed bougie should, of course, be well oiled before its introduction; and if the points of the caustic are well covered with lard, there need be no fear of its acting before it reaches the stricture. The bougie should be gently pressed against the stricture for a minute or two if impermeable, and then withdrawn. When the caustic is applied to permeable obstructions, the bougie should be passed three or four times over the whole surface of the stricture. To impermeable strictures the caustic should be applied with greater caution than to such as are permeable; for should retention of urine occur, it will be more easily relieved in the latter than in the former. It usually happens that, after one or two applications of the caustic, the bougie will be found to enter the obstruction.

Before applying potassa fusa to impermeable strictures, every precaution should be taken to guard against irritation. If convenient, the application may be made at bed-time, taking care that the patient passes his urine just before; and should he have been subject to rigors or retention, it will be best to administer an opiate injection an hour previous to the operation. Many surgeons appear to have been afraid of using potassa fusa in stricture, from its so readily liquefying when exposed to the air, having on that ground principally preferred the argentum nitratum. Such fears are, however, groundless; for, contrary to what is generally supposed, potassa fusa, from its forming with oil and mucus a slimy saponaceous compound, admits of being more easily confined to the strictured portion of the urethra than the more watery solution caused by the nitrate of silver. This is one advantage in favour of the caustic alkali. Another, arising from this miscibility with oily substances, is, that its action can be better regulated than that of the nitrate. It may be used either as a mild stimulant or as a powerful caustic.

It appears to me, however, that the principal superiority of this caustic to the nitrate of silver consists in its more powerful solvent effect in removing hard strictures, and that with perfect safety and comparatively with but little pain. It has been previously stated, that when used for the destruction of hard gristly strictures, it must be more freely applied than recommended by Mr. Whately; but the quantity should be very gradually increased, and regulated according to its effects. Some of the accidents caused by the nitrate of silver, when used for the destruction of strictures, have arisen either from the slough which it produced having so completely obstructed the previously contracted channel as to cause retention of urine, or, on its separation, hæmorrhage to a considerable amount. From the tendency of the nitrate of silver to produce adhesive inflammation, it is probable that the coagulable lymph, caused by its free application, may form no slight barrier to its destructive effects. This tendency, I think, may, in some degree, account for the great number of applications of this caustic which were required in some of Sir Everard Home's cases.

Potassa fusa, when used for the destruction of a stricture, instead of causing a solid slough, appears to exert its salutary effects by a process of inflammatory softening and dissolution of the thickened tissue forming the obstruction. A sufficiently free application of this caustic, to be effective in old hard strictures, is usually followed by more or less of a slimy muco-purulent discharge, at first generally slightly tinged with blood, but soon becoming of a dirty white colour. The term abrasion, used by Mr. Whately, is not certainly the most appropriate to signify the effects of the caustic potash in the removal of strictures, for its action cannot be regarded as mechanical. The term appears to have been used by him to express a slight solvent effect, in reality an ulcerative dissolution of the surface of the stricture. Probably the best explanation of the action of these two caustics, when applied for the destruction of strictures, is that the nitrate of silver causes a slough often sufficiently solid to obstruct the passage of the urine, whilst the more solvent effect of the potassa fusa is quickly followed by a thick slimy discharge of the tissues which it has destroyed.

There is a passage in the last edition of Professor Miller's "Surgery," with regard to ulceration, which so completely coincides with my own views upon this point, and is so applicable to my present subject, that I shall take the liberty of quoting it in this place; "There is every reason to believe that ulceration may

be regarded as a molecular death; a gradual softening and disintegration of tissue, molecule by molecule, the effete matter being mixed with purulent or other secretions of the part, and thus carried out of the system. This process is generally one of true inflammation, or, at all events, connected with some grade of inflammatory action. The steps are—first, true inflammation, with suppuration and softening of the inflamed part; second, disintegration, or death and detachment in minute portions or molecules; third, mixture with the pus and removal by one common discharge. With this process absorption can have little or nothing to do. All new formations are prone to ulceration, being of low organization and of weak vital powers. Absorption is proved to be feeble during ulceration. In sloughing the part no longer dies in molecules, but in mass, and a sloughing sore is said to exist."

The good effects of potassa fusa are often strikingly manifested in highly irritable and very vascular strictures, which readily bleed upon slight pressure by the bougie. In many such cases three or four mild applications of the caustic will be found to remove both their irritability and hæmorrhagic disposition, so as to render them dilatable. In strictures strongly predisposed to spasm, if not firm and of long duration, it will be best to apply the potash, at first in such small quantities that its action will be merely that of a powerful stimulant, which may probably remove their morbid irritability sufficiently to permit of their subsequent dilatation. I believe, however, that in the majority of such cases, where the disposition to spasm is strongly marked, the caustic must be used in sufficient quantity to destroy the irritable surface of the obstruction. When a stricture has been so far removed by the application of potassa fusa as to admit the introduction of a middle-sized bougie, it will be best to discontinue the use of the caustic, unless there should be difficulty in its subsequent dilatation, when an occasional application of the remedy will often be found serviceable.

If potassa fusa be used with proper caution, it will not cause bleeding of any consequence. Where patients are predisposed to rigors, they may occasionally occur after the application of the potash; but the unarmed bougie, it must be recollected, in such constitutions, will often have the same effect. But the fact is, the application of the caustic alkali has generally a remarkable effect in preventing the occurrence of rigors.

Two or three applications have frequently so much relieved the

irritability of the bladder attending bad cases of stricture, that patients have very often called my attention to this improvement in their condition, which has taken place some little time before the bougie had passed through the obstruction. Instead of being obliged to rise every hour or two in the night to pass their urine, as was the case previously to the application of the caustic, they have been disturbed only once or twice for that purpose.

In two cases of impermeable strictures lately under my care, in which rigors had frequently occurred from the introduction of the bougie by other surgeons, they happened but once during my treatment, and that was, in each patient, a few hours after, when by the use of potassa fusa, I, for the first time, succeeded in passing an instrument through the obstruction. The administration of an opiate will, however, in general, prevent the occurrence of rigors.

The cases in which I have found the potassa fusa advantageous may be generally described as—first, strictures having a cartilaginous hardness and being impervious to instruments; secondly, strictures of long standing, which, although admitting the passage of a small bougie, bleed more or less freely on its introduction; thirdly, irritable strictures, and such as have a marked disposition to spasm.

The periods at which it will be most advisable to repeat the application of the potassa fusa must depend upon its effects, and the nature of the cases in which it is used. In many old chronic strictures, I have used the potash advantageously every second or third day; and in some few instances, under peculiar circumstances, even oftener. It will be seen that my views with regard to this method of treatment, differ materially from those of Mr. Whately. I do not use the potassa fusa in all cases indiscriminately, but only in such as do not yield satisfactorily to simple dilatation. I have found it generally necessary to employ the caustic alkali in larger quantities than he recommended; the minute portions used by him having produced scarcely any perceptible effect upon strictures, which, however, yielded to its more free application. I have also found that the caustic may be advantageously used at shorter intervals than advised by that gentleman, which is frequently of no slight importance, especially to patients who have to come to London for treatment. I generally, as before mentioned, discontinue the use of caustic as soon as a stricture will readily yield to ordinary dilatation. As a general rule, it will be

best to commence the use of the potassa fusa in very small quantities, of the size of a common pin's head, especially in cases of impermeable stricture.

Very great care will be required in applying caustic of any kind where there are false passages; and in such cases, if the obstruction be beyond the straight part of the urethra, I use a curved canula for that purpose. Wherever false passages are known to exist, and where instruments have been regularly passed, before commencing the use of potassa fusa, the patient should be kept as quiet as possible for four or five weeks, by which time the false channels may have healed, or become so much closed as with tolerable caution to be avoided. Obstructions in the curved portion of the urethra, although requiring much care in the application of caustic, will usually be found more readily to yield to that remedy, or indeed to any other method of treatment, than when they are situated in the straight part of the canal.

Except obstructions caused by severe injury of the urethra, when it has been forcibly pressed against the pubes, there are none, according to my experience, more difficult of management, whatever means may be employed, than hard, tight strictures of long standing, within the first four or five inches from the external orifice of the canal. In such strictures there is often considerable induration of the corpus spongiosum surrounding the obstruction, forming a firm zone of highly elastic tissue, which, although admitting of being stretched to a certain extent, yet, if further dilatation be attempted, irritation will ensue, and the contraction become worse. Where there is so much condensation of the corpus spongiosum, it cannot be expected that potassa fusa, or any caustic, can be safely applied for its entire destruction; but a few mild applications of the potash will often so much lessen the irritability of the stricture as to permit the introduction of a moderate sized bougie, so as to afford relief from all the more troublesome symptoms of the disease. It is fortunate that cases of this description are, comparatively, of rare occurrence; but it is as well to know that there are such, which, whether we treat them by dilatation simply, by caustic, or by cutting, have so strong a disposition to recontraction as to defy human skill to cure them. Some pains should be taken to ascertain the precise point to which these strictures will admit of being stretched without irritation, and then the bougie, having done all the good it can, should not be increased in size. Strictures in the straight part of the urethra,

which consist principally of thickening of the mucous and submucous tissues of the canal, with but slight induration of the spongy portion, are, in general, just as easily removed by potassa fusa as those at the bulb.

Of all modern writers, Mr. Guthrie seems to have had the most favourable opinion of the employment of caustic in strictures of the urethra, the argentum nitratum being that which he generally used. Mr. Guthrie seldom had recourse to potassa fusa in stricture, preferring the argentum nitratum; but, with his usual candour, he admitted that the former, when used in small quantity, is safer than the latter. From the whole tenor of that able surgeon's observations, it is evident that he thought highly of the remedial powers of caustic in stricture, although, in compliance with prevailing prejudice, he seemed to be a little coy in expressing the full extent of his approbation.

My preference for the use of potassa fusa in the treatment of urethral obstructions, has arisen from a well-founded conviction, the result of ample experience, of its great superiority, both in safety as well as efficacy, to the argentum nitratum, when employed for the removal of the thickened tissues of a permanent stricture. I believe, also, that the former will, in most cases, prove quite as effectual, and commonly more so, than the latter, in the relief of spasm or irritation. I generally employ potassa fusa for the relief of irritation, instead of the nitrate, because, as was observed by Mr. Abernethy, when speaking of the two caustics in the treatment of stricture, "I think the kali a safer thing to use." Another reason for my having recourse to the potash, instead of the nitrate, to relieve irritation, is, that I find that the former has the additional advantage of more effectually opening the stricture than the latter. If, however, I had found the good effects of potassa fusa, in stricture, limited to the mere relief of irritation and spasm, the profession would never have been troubled with any observations of mine upon the subject; for it has always appeared to me that the great value of the caustic potash, in stricture, consists in its powerful solvent effect upon the tissues forming the obstruction. Of its great superiority, in this respect, to the nitrate of silver, I am, indeed, daily more and more convinced. In many cases of impassable stricture, by a judicious application of potassa fusa, the surgeon will be enabled, in a few days, or weeks at farthest, to get an instrument safely into the bladder. Indeed, I think that such will be the result in most

cases; for, at present, as well as formerly, my experience leads me to conclude that the exceptions will be few.

In my remarks on the use of the argentum nitratum, I have put in italics a passage from the work of Sir Everard Home, in which he observes, that in cases where the strictured part is so hard as not to be removed by the nitrate of silver, it is to be regretted that we have not a more powerful caustic, capable of being applied with safety to the urethra. I believe that the potassa fusa, so strongly recommended by his contemporary, Mr. Whately, was the very agent which was required by Sir Everard, although it would have been necessary to use it more freely than was recommended by the former. My proofs for such an assertion are, that I have succeeded, in similar cases, with caustic potash, after the nitrate of silver had failed. I have had no opportunity, by *post-mortem* examination, of ascertaining the appearance of the lining membrane of the urethra, in cases where strictures had been removed by potassa fusa. It will be seen that Sir Everard Home has stated that, on a *post-mortem* examination of patients whose strictures had been destroyed by nitrate of silver several years previous to death, the parts where the strictures had existed were of the same smooth appearance as the rest of the canal.

It would be productive of no useful purpose here to enter into the question of the reproduction of mucous membranes, as it has been proved, in several instances, that the breach caused by their destruction has been repaired by a new formation, satisfactorily discharging all the functions of the original structure. It should also be borne in mind that, in bad cases of stricture, requiring the free use of caustic, the mucous membrane, at the seat of disease, has generally been so thickened by inflammation as to have retained but little of its normal organization. Instead of having the polished surface and suppleness of healthy mucous membrane, it is, in fact, transformed into a rough, unyielding fibrous, or fibro-semi-cartilaginous-like tissue. But discarding theory, of one fact I am certain, that, for all useful intents and purposes, in cases in which strictures have been removed by potassa fusa, the functions of the urethra have been as satisfactorily performed as when the obstruction had been treated simply by dilatation. It is well known that, in cases of retention of urine from enlarged prostrate, its middle lobe has sometimes been perforated by the catheter, and the patient has afterwards lived for months, or even years, without having again suffered from retention. The new channel made by

the catheter has, in fact, answered every useful purpose of the original passage. Should the surgeon have well done his part of the work, in the removal of a bad stricture by potassa fusa, he may rest assured that the resources of nature are amply sufficient for the substitution of a lining membrane for the enlarged channel, equal in utility, and less disposed to irritation, than that which had previously formed the internal coat of the contracted part of the urethra.

To bring the subject fairly before the reader, let us suppose that we have presented to us, for treatment, a bad case of stricture pervious to the urine, into which, however, no instrument can be made to enter without the employment of so much force as might lacerate the urethra. In such a case what is the best practice to be pursued? "That is the question." It may possibly be one of vital importance to the patient. Shall we adopt Dupuytren's favourite mode of proceeding, which he called vital dilatation? Shall we endeavour to overcome the obstruction, by making steady pressure against it for several minutes with a small metallic sound, and repeat the operation as often as is prudent, with the hope of thus eventually getting an instrument into the bladder? Or shall we have recourse to the application of caustic? I think it may be assumed, that division of the stricture either by the lancetted catheter, or by an incision in the perineum, will be justifiable only after the failure of less severe measures, except in extremely urgent cases.

With regard to the propriety of adopting the first plan, that of Dupuytren, my observations will be seen under the head of "Dilatation of Strictures by retention of the Catheter." The second plan will, I know, occasionally succeed; but it requires for its success considerable tact, a light and steady hand, with a thorough knowledge of the passage to the bladder in all its various diseased obstructions and deviations. The instrument usually employed, indeed the only effective one for the penetration of an old hard stricture, is a metallic sound, well rounded at its point, its size from No. 6 to No. 8; but the less the size the greater will be the chance of its causing mischief. Sir B. Brodie, it will be seen, has recommended the adoption of this plan, he having himself employed it successfully in some difficult cases. I have used this method occasionally, with success, in cases where there were false passages, in old hard strictures. It should not, however, be undertaken except by surgeons accustomed to the management of bad strictures, as it requires great care to succeed in getting an instrument into the

bladder without either lacerating the urethra, or making false passages in it.

Sir B. Brodie, in his usual clear and graphic style, has certainly given us excellent rules for the employment of the sound in impassable strictures—a style, by-the-bye, well worthy of imitation, and in which, as in a mirror, nature becomes truthfully reflected in all the lights and shades of disease. Notwithstanding, however, the excellence of the rules given to us for the management of the sound in impassable strictures, it will be found, in practice, that it is no easy matter to follow them, to know, in fact, what is the exact degree of force that can be employed with safety. It has been truly said, that "it is hard to stop at the precise point where the shade of a vice steals upon the brilliancy of a virtue." It is equally difficult, when endeavouring to pass a small metallic sound through an impassable stricture, to stop at the precise limits, which, if exceeded, that which was only a proper degree of force, may become injurious violence. To use such an instrument with safety to the patient will often tax to the utmost the skill of the most experienced surgeon.

The latter plan, the potassa fusa being the caustic employed, is the one which I commonly adopt in impassable stricture, from a conviction that it is, at all events, the safest, if not, as I certainly believe to be, the most effectual for the relief of the patient in the majority of such cases.

It may be asked, how it is that others have not been equally successful as myself in the treatment of strictures with caustic. The principal reason of their failure is, I believe, that the nitrate of silver has been the caustic usually employed by surgeons, which, as previously stated, is far less efficient in its action than the potassa fusa. But even supposing the caustic potash to have been the agent used, do we not constantly find in practice that a particular remedy proves more successful with one person than with another? Every surgeon well knows how much success depends upon the proper handling of a remedy. To use the potassa fusa successfully in bad cases of stricture, often requires a considerable degree of confidence derived from long experience in the good it is able to effect. It is, in fact, this faith and knowledge that will lead one person to persevere in the use of the potash, long after another would probably have thrown this truly valuable remedy aside, from a feeling of disappointment.

It is as well in this place to state, that a case may occa-

sionally occur, in which the use of the potassa fusa and the bougie alone cause disappointment. An irritable stricture, when greatly contracted, and complicated with perineal fistulæ, often proves very troublesome, and may possibly baffle the best efforts of the surgeon, so long as the patient goes about following his usual avocations. In such cases, rigors are apt to occur, even after the most gentle use of instruments.

Although, by the careful employment of the potassa fusa, some little progress in dilatation may be made, yet the improvement will be but of short duration, the urethral contraction becoming in a few days as bad as ever. As the difficulty in accomplishing dilatation in such a case undoubtedly arises from the urine passing over and through the fistulous openings in the urethra, which keeps up more or less irritation and inflammation at the seat of disease, it must be remedied by the retention of the catheter, which, of course, requires confinement of the patient to his room: with this addition to the occasional application of the potash, the patient will generally be restored to health. The case must, however, be closely watched, or the retention of the catheter, if not carefully attended to, may do harm instead of good.

I had a case of this kind under my care some time ago, in which it was necessary to add the treatment by retention of the catheter, to that of the potassa fusa, before satisfactory relief could be obtained. It was an instance of very narrow stricture, in a highly sensitive urethra, complicated with fistulæ, and considerable disorder of the digestive organs, causing great constitutional irritability. The stricture was disposed to bleed on very gentle pressure, and rigors often occurred after the introduction of a soft bougie, which was the only dilating instrument that could be borne. I was, on several occasions, enabled by the use of the potassa fusa, to pass a No. 3 bougie into the bladder; but the patient's avocations, whilst he was under my care, did not permit of his leaving them for the time required for the retention of the catheter, which I very much regretted. As the treatment of the case was unusually protracted, I advised this gentleman to consult another surgeon, at the same time telling him, that there were only two means which would be likely to improve his condition; the retention of the catheter, or perineal section.

The eminent surgeon whom he consulted, said that perineal section was the only measure likely to afford him any benefit. When I saw the patient afterwards, I strongly advised him to try

the effect of the retention of the catheter, before submitting to perineal section. He left me with the understanding that, as soon as he could spare the time, I should try what retention of the catheter would do for him. I have not seen this gentleman since, but was very glad to hear that another surgeon had treated him successfully by retention of the catheter, conjoined with the use of potassa fusa. I have alluded to this case particularly, as it is the only one that has occurred in my practice, in which it appeared to me that the operation of perineal section might probably become justifiable.

The treatment of an impassable stricture, by the potassa fusa, will, for some little time, require much care on the part of the surgeon, as there are two things which he must more especially endeavour to avoid, viz., causing retention of urine and a false passage. The former will not be likely to occur, if the potassa fusa be applied at first in very small quantities, and only gentle pressure be made with the bougie. It will be desirable that the patient should remain quiet for some few hours after its application, which can be managed by having recourse to the operation at bed-time, should his avocations prevent his resting during the day. With these precautions, the use of the caustic potash will usually diminish, instead of augment the disposition to retention of urine, its ordinary operation being that of a sedative; two or three applications often allaying irritation in a remarkable degree, by removing more or less the morbid sensibility of the stricture. To guard against making a false passage, if the armed bougie, when gently pressed against the stricture, should advance without being grasped, it should instantly be withdrawn, and before the next application of the potash it will be best to take an impression of the obstruction by the model bougie; indeed, this may be often done advantageously at the commencement of the treatment, especially where there have been frequent unsuccessful attempts to pass instruments. When the armed bougie has fairly entered the obstruction, it should be gently pressed forward for a minute or two, so as to allow the caustic to dissolve. In old cases, where the stricture is hard and gristly, an extended experience has convinced me that a more free application of the potassa fusa can be advantageously made than in my former observations I ventured to recommend. I should, however, advise surgeons not very familiar with the use of this caustic in bad cases of stricture, to be very careful to employ it only in small quantities at a time.

When using the armed bougie, it should be recollected, that the channel through which the urine passes in these cases, is often irregular, and that the greatest care should, therefore, be taken to withdraw the instrument when not grasped; or even then, if it be found to deviate beyond a slight degree from the natural course of the urethra; for it should never be forgotten, that there are instances in which the bougie may be very firmly grasped whilst in a false passage.

In the application of potassa fusa to old gristly strictures, more or less mucous or muco-purulent discharge, with but little and often no admixture of blood, is all the inconvenience that usually follows; for, as to pain, there is commonly scarcely any of consequence. It will sometimes, however, happen that a patient experiences rather a sharp, scalding pain during the first act of micturition, after the introduction of the armed bougie; to avoid which, in future, the patient should be desired to pass his urine just before the operation, so that some few hours may elapse before he requires to empty his bladder.

There are occasionally strictures so irritable, that when but gently pressed against with a bougie, more or less pain is experienced. In these cases, two or three applications of potassa fusa usually remove the irritability. I may here repeat, that no hæmorrhage of any consequence need ever be feared when the caustic potash is properly used. In no instance has this ever occurred, in my practice, nor, to my knowledge, has anything like a solid slough been caused in the great number of cases in which I have applied the remedy. When a stricture has become pervious, the armed bougie can be advantageously passed slowly backwards and forwards over the whole inner surface of the obstruction. In the treatment of old hard impervious strictures with potassa fusa, it must not be expected that they are to disappear, like magic, by a few applications of the remedy. Such good fortune will seldom be obtained should the stricture involve more than a slight portion of the canal. The surgeon should, indeed, expect, in many of these cases, to find the obstructed passage so rugged and intricate that his progress to be safe must necessarily be also slow. If, after each application of the caustic, the bougie should be found to advance, however slightly, there will be good reason to expect that, by a steady perseverance in the treatment, success will eventually be obtained, and this often in cases which appeared to be most unpromising.

It may now fairly be asked, what has been gained, after all this trouble and perseverance, which could not, very probably, have been accomplished in much less time by division of the stricture with a lancetted catheter, or by perineal incision? To which it may be answered, that the patient has, at all events, escaped an operation not always free from hazard, even if the dread usually entertained of such proceedings be accounted as nought; and should the potassa fusa eventually fail in clearing the way to the bladder, division of the stricture can then be practised. Of course, in all cases of impassable stricture, it is possible that continued retention of urine may render imperative an immediate operation for its relief.

I believe, also, that in these cases, by the potassa fusa treatment, the relief afforded will generally be more permanent than when incision of the stricture has been practised, to say nothing of the pain and irritation caused by retention of the catheter, often indispensable in the latter method of proceeding. After having succeeded, by the application of potassa fusa, in effecting a passage to the bladder, the remaining dilatation of the stricture can often be readily effected by the common bougie or sound, the latter being generally in hard strictures, as previously observed, by far the best dilating instrument. Should the obstruction, however, yield very slowly, much good will often be done by the occasional use of the potash. Where a considerable portion of the urethra is much thickened, and of a gristly hardness, it must not be expected that the whole of the diseased tissue can be safely removed by the caustic. I have generally found, however, that, after a free passage for the urine has been obtained by dilatation of the urethra to nearly its healthy size, the greater portion of the thickened tissue will gradually disappear; and, if the patient should prudently follow the direction of his surgeon in continuing regularly the use of the bougie or sound, the remaining part of the disease, with few exceptions, will eventually lose much of its disposition to contract.

There are old strictures of small extent, varying from a slight annular obstruction to one of an inch or rather more in extent; and there are others, where the mischief is comparatively recent, but which often prove very troublesome from their extreme irritability. Such strictures, I have good reason to believe, will be less likely to return when treated by potassa fusa, than when

dilated with the bougie only, as the potash seems more effectually than the latter to remove the diseased tissue.

The objection urged by the opponents of the use of caustic in urethral obstructions, that its application has sometimes been productive of stricture, will, in general, be found to merit but little attention, being, with few exceptions, brought forward by gentlemen having no experience of the treatment which, following the fashion of the day, they think proper to condemn. It must be recollected, that caustic of any kind is seldom used but in strictures of an unyielding character, except in cases where it is applied in a mild manner for the relief of spasm.

From long experience of the effects of the caustic potash when applied to urethral obstructions, I can confidently assert that it has evinced no tendency to the production or increase of stricture in the numerous instances in which the remedy has been used by myself. I am moreover thoroughly convinced, that there will be found less disposition to recontraction in the more aggravated forms of stricture, when properly treated with potassa fusa, than when by dilatation simply.

The caustic potash has been of late years much more freely applied to the mouth of the womb, than it is required in urethral obstructions, and I am not aware of its having, in any single instance, caused a stricture of the os or cervix uteri. There are some interesting observations in the "Monthly Journal of Medical Science," for January, 1850, by Professor Simpson, who, when alluding to the application of nitrate of silver and potassa fusa to the small vesicular polypi of the cervix uteri, offers the following remarks, which so entirely accord with the results of my own experience of the effects of those caustics in urethral stricture, that I have much satisfaction in quoting them:—

"To effect a complete cure, we require other means; and for this purpose, the application of caustics to the mucous membrane of the cervix answers every indication. Nitrate of silver generally proves too weak for this purpose, unless repeated very often, and combined with scarifications of the mucous surface. We possess a far more potent and certain caustic for the purpose, and one that is perfectly manageable, in potassa fusa. The surface of the os and cervix, when small vascular polypi exist, is often found to be the seat of chronic inflammatory ulceration; and sometimes the submucous tissue, and the structure of the cervix, are also the seat of

chronic inflammatory hypertrophy and induration. When such a combination exists, the potassa fusa is doubly useful, as the application at once destroys the polypi, and sets up a new and healthy action in the affected and morbid tissues of the cervix."

It will doubtless be thought by many persons that my account of the effects of the potassa fusa in stricture is much too favourable; but nothing can be further from my intention than to mislead others by an over-statement of its powers in that disease. All I can say is, that it has less frequently disappointed me than most remedies. It is not, and never has been my intention to speak of the caustic potash as a specific in all cases of stricture. I am daily more and more convinced, however, that it is an agent of great value in the management of many cases of stricture, and that the surgeon who gives it a proper trial will very often be extremely gratified, and probably not a little surprised, at its good effects. The fact is, that all the mischievous consequences caused by the nitrate of silver, when injudiciously used, have equally and, according to my experience, most unjustly been attributed to the proper use of the caustic potash, such as inflammation, more or less severe, sometimes involving the prostrate and bladder, abscesses, fistulous openings, false passages, and profuse hæmorrhage. How far in the hands of others the improper use of the potassa fusa may have produced these accidents, it is, of course, impossible for me to say; but in mine, its action has been of a mild character; and having now used the remedy most extensively, I am perhaps entitled to speak with some degree of confidence upon the subject.

I can truly say, that the application of the caustic potash to urethral stricture in my hands has never been attended with any results which have caused me the slightest anxiety.

Let it be remembered, however, that the above favourable account applies only to the careful application of the caustic potash, which it has been my constant endeavour to enforce, at the risk of being charged with tautology, considering the importance of the subject a sufficient justification for such repetition.

I had under my care a case in which there had long been a false passage, into which, for some years, instruments had been passed, on the supposition that they were in the right direction. I was at first deceived in a similar manner, as the catheter was grasped firmly whilst in the false passage, communicating precisely the same sensation as when the instrument is passed through a hard stricture; and it was only on finding it

proceed as far as the bladder, that I became fully aware of the existence of a false passage. In such a case, whatever may be the instrument employed, it is very difficult to avoid the false passage; everything being sure to take that course unless great precaution be used. If the potassa fusa be used in such a case as this, it will be best to apply it in a silver canula containing a stilet, to the end of which is attached a small cup for the caustic, which is concealed within the canula until the instrument arrives at the stricture, when the stilet must be pushed forward. Should the obstruction be beyond the straight part of the urethra, a curved canula must, of course, be used.

Old, hard, narrow strictures, complicated with one or more false passages, are undoubtedly the most difficult of all to manage, often requiring great skill and caution in their treatment.

Having been by far the greater part of my professional life attached to an extensive public institution, where stricture cases are of frequent occurrence, I have had ample opportunities of witnessing the effects of different kinds of treatment in urethral obstructions. The result of my experience is, that more may be done in bad cases of stricture, with the least chance of injury, by a judicious employment of potassa fusa, than by any other means. Prejudice is, however, all powerful. I have often seen surgeons of high character, whose objections to the employment of caustic, in any form or quantity, were insurmountable, yet who did not hesitate to force a steel sound into the bladder at the cost of no slight degree of bleeding. Surely there was some little inconsistency in those who were so prejudiced against the use of caustic in any form, thus disregarding the laceration and subsequent inflammation caused by their own practice. It must, however, be admitted, to borrow a military phrase, that there is more *éclat* to be obtained by forcibly entering the bladder by storm, than by the more slow, but often safer, process of the mine.

It has indeed occurred to me to witness so many ill effects from the employment of what has at the time appeared a necessary degree of force in the dilatation of unyielding strictures, that I gladly have recourse to the assistance of potassa fusa in such cases.

I may here remark, that patients usually find so little inconvenience and so much advantage from the use of the caustic potash in these cases that they are generally anxious for its repetition.

It will be seen, on perusal of the cases, that I have alluded in

several instances to the patients, before their application to me, having been treated for a long time by surgeons of high character, to prove that dilatation had received a fair trial previous to the use of the caustic alkali, to which remedy must entirely be ascribed my success where others had failed.

Many will, doubtless, be somewhat surprised at my having ventured, in some of the cases, to apply the caustic alkali daily. It must, however, be borne in mind that such cases were old strictures of a cartilaginous hardness, which are seldom much predisposed to spasm. The principal suffering of patients with such obstructions, is usually caused by the straining efforts of the bladder to force the urine through a highly contracted unyielding channel. The diseased tissue itself has commonly but little sensibility; indeed the free application of potassa fusa to its interior seldom causes pain worth mentioning. It is in these cases—where, from the strong contractions of the bladder, with its muscular power frequently increased to a great extent, and where there must be constant apprehension of the yielding of the urethral canal behind the obstruction—that the caustic alkali will be found truly valuable. In such cases as these, when once the armed bougie has fairly entered the gristly mass, to obtain success the caustic must be boldly and freely used.

I was happy to see that Dr. Gross, the distinguished professor of surgery in the University of Louisville, has employed the potassa fusa in the treatment of stricture, and it affords me much gratification to quote the following passage from his work on "The Urinary Organs:"—"I have myself employed it (the potassa fusa) with the most happy effects, in cases in which the lunar caustic had failed to afford relief. Much prejudice has existed in the minds of surgeons, because they seem to think that its application must necessarily be followed by a slough. Nothing can be more erroneous."

In concluding this subject, it may be as well to state that the method of treating strictures by potassa fusa was brought forward by me in a paper read at the Westminster Medical Society, on the 15th of February, 1840, having then for several years successfully employed that remedy in the treatment of stricture. My object in that paper was principally to show the great value of potassa fusa in impermeable strictures, and at the same time to define, with some degree of precision, the nature of the cases in which it would prove useful. I can truly say, that subsequent and far more exten-

sive experience has increased my very high estimation of the admirable effects of the caustic alkali, in the relief or cure of urethral obstructions. No remedy I have ever employed has afforded me so much satisfaction, and it has very often surpassed my expectations in the speedy relief it has afforded in cases of the worst description.

Having now, to the best of my knowledge, given an accurate account of the effects of the potassa fusa as employed by me for more than twenty years in the treatment of stricture, I cannot but hope that my success may be the means of inducing others to avail themselves of the powers of this truly valuable remedy, and that I shall thus have contributed in some degree to the alleviation of human suffering.

Five years have now elapsed since the preceding observations were written, and I can truly say that further experience has only confirmed my opinion, that the potassa fusa, when judiciously employed, is an invaluable remedial agent in the more intractable forms of urethral stricture.

I cannot let this opportunity pass, without again calling attention to the fact, that the effects of the argentum nitratum and of the potassa fusa admit of no comparison, as they are totally dissimilar; that the former, when freely used, from its tendency to cause adhesive inflammation, has often been found to increase the urethral obstruction, whilst the remarkably solvent powers of the latter have no such tendency.

The effects of the alkaline caustic are, indeed, so strikingly superior to those of the nitrate of silver, that the preference which has so generally been given to the latter, is not easily to be explained. We rarely, if ever, hear of the employment of the caustic alkali in urethral stricture by the French surgeons; and in England, the knowledge of its value as a therapeutic agent in that disease is but very limited.

The nitrate of silver is, I believe, the only caustic at present used by the French surgeons in the treatment of urethral stricture. Civiale, in his able and comprehensive treatise on that subject, does not even allude to the potassa fusa as a remedial agent in stricture. The nitrate of silver is still very frequently employed in France, in the more aggravated cases of urethral obstruction. Amongst those in that country who have the most enthusiastically advocated its employment, are Ducamp and Lalle-

mande. Leroy d'Etiolles and Civiale, although not such enthusiasts for its use as the former, not unfrequently have recourse to this caustic in their treatment of some irritable forms of stricture, in which they have found it very useful.

I have lately seen expressed an opinion that strictures, in the dilatation of which potassa fusa has been employed, have a greater tendency to recontraction than others, treated by simple dilatation. Such, however, is not the fact, but quite the contrary, as the application of the potash, by removing more or less of the thickened tissue, has the effect of diminishing, instead of increasing, the contractile tendency of the obstruction.

This statement is not lightly made, but from a knowledge that in some of the more aggravated forms of hard gristly strictures, in which I was enabled by the use of potassa fusa to effect full dilatation, after its failure in skilful hands by the ordinary means, the patients experienced no difficulty in preventing a return of the contraction, by adopting the precaution of occasionally passing a bougie.

In my advocacy of the use of the caustic potash as an assistant to dilatation in the more intractable forms of urethral stricture, I have had to contend with the prejudices of the day, which were all in favour of cutting, and so strongly against the employment of caustic, that to use it was regarded as heresy.

Had it not been for this prejudice, the ample evidence adduced by myself and others, of the efficacy and perfect safety of the potassa fusa in urethral stricture, would surely, ere this, have led to its more general employment in the severer cases of that disease.

It may truly be said that there is much in a name; and had the potassa fusa been called a solvent instead of a caustic, the case would have been far different.

To surgeons who object to the employment of potassa fusa, from the fear that the common bougie is not a safe conductor for caustic, I recommend the employment of the tubes or portes caustiques, which I sometimes use in cases where there are false passages.

After having faithfully communicated to the profession the results of many years' experience of the effects of the caustic potash upon urethral stricture, it might be thought unnecessary to write another word regarding its efficacy as a valuable curative agent in that disease, especially as my testimony accords with the expe-

EXPLANATION OF THE PORTES CAUSTIQUES.

The portes caustiques consist of a straight and curved canula, each having a stilet, with a cup at the end, for the conveyance of the caustic. The largest canula I employ is of the size of No. 10, until within an inch and a half of its point, and gradually tapers to No. 8 at its vesical extremity, which is well rounded off, so as to pass freely along the urethra. The portes caustiques are graduated and made of silver, with the exception of about an inch from their points, which are of palladium. It will be necessary to have two smaller tubes of the size of No. 8 in the shaft, gradually tapering, like the others, to No. 6 at their points. A considerable portion of the stilet of the curved canula is made of flexible spiral silver wire, so that it may adapt itself to the hand of the instrument.

The curved canula is about 10½ inches in length, and the straight one 6½ inches. I find the best and a very simple method of fixing the potassa fusa, is to fill the cup with a piece of soft bougie, in which a hole can be made of the size of the piece of caustic to be used, and the potass then inserted as in the ordinary method.

The cup can be so adjusted by a screw attached to the lower part of the stilet, as either to be kept on a level with the end of the tube, or to project a little from it.

rience of those who have fairly tested its remedial powers, in cases in which simple dilatation had failed. The inefficacy of the caustic potash, for the relief of the more intractable forms of stricture, has, however, been so confidently asserted by some high surgical authorities, and as confidently reasserted by those who place implicit faith in their infallibility, that I take the present opportunity of repeating my assurance of its efficacy, when properly used, in the hope that others may be induced to give the remedy a fair trial; at all events, before submitting their patients to the undoubtedly hazardous operation of perineal section.

It is the misfortune of all who strongly recommend any particular method of treatment, to have their views either misunderstood or misrepresented. They are all supposed, in vulgar parlance, "to ride their hobby." My only preference for the treatment by potassa fusa of the more intractable forms of stricture, is simply that I have found it generally to answer my purpose in effecting their satisfactory dilatation, besides being so entirely free from injurious effects as never, in a single instance, to have caused me the least anxiety for the safety of a patient. With my knowledge of the efficiency of the potassa fusa in some of the worst forms of stricture, I could not conscientiously resort to perineal section until the potash had failed after a proper trial, unless the case was one in which the caustic was evidently inadmissible.

With regard to the highly important question of the chance of effecting a permanent cure of stricture, I have good reason to believe, that after the obstruction has been so sufficiently acted upon by the potassa fusa as to admit of full dilatation by the bougie, there will, in general, be much less tendency to recontraction than when division has been effected by perineal section on a grooved sound. Upon this point my experience now enables me to speak confidently. In both cases the precaution of continuing for a long time the regular introduction of a full-sized dilating instrument cannot be too strongly enforced. It is true that, in some instances, the contractile tendency may be little or nothing, yet the precaution is, at all events, a wise one.

It is the great advantage of combining safety with efficiency, possessed by the potassa fusa in many of the more intractable forms of strictured urethra, which has induced me, from time to time, during many years, so perseveringly to solicit the attention of the profession to the singular efficacy of that remedy in a disease which very often bids defiance to the ordinary methods of treatment.

Well knowing that nothing is so injurious to any remedial measure as the recommendation of its indiscriminate employment, I have always taken especial care to point out the particular cases in which the potassa fusa had, in my hands, proved advantageous.

As one instance among many, of the manner in which my views have been misrepresented, I may mention, that in a late work on Stricture, in which the author professes to give a summary of the opinions of different writers on that disease, it is stated, that I regard the potassa fusa as a remedy for all cases of stricture except the mildest; which assertion is so very far from the truth, so completely unsupported by any observations contained in my work on Stricture, that I am quite at a loss to comprehend the grounds upon which it could have been made. So far, indeed, from advocating the employment of potassa fusa in all but the mildest forms of urethral stricture, it is well known that I have recourse to that remedy only in the more intractable cases of that disease, and then, not until I had fairly tried the effects of simple dilatation, unless that process had previously failed in good hands, or the case was one in which the use of the caustic would evidently prove inefficient.

I take the present opportunity of once more observing, that if the potassa fusa is to be employed as an effective remedy for the more obstinate forms of hard, gristly strictures, it must be as an escharotic.

To prevent disappointment in the effects of the potassa fusa in such cases, I am most desirous not to be misunderstood upon this point, more particularly as an opinion has lately been very confidently and somewhat presumptuously expressed, that it should never be used as a caustic. I say "presumptuously," because the opinion so authoritatively given comes from a gentleman whose practical experience of the effects of the application of potassa fusa in stricture is evidently most limited. It is the powerful solvent properties of the potassa fusa which render it especially valuable as a remedial agent in the worst forms of stricture, the old, hard, gristly, undilatable obstructions. As one fact, however, is worth a thousand theories, the best evidence in support of my views will be found in the cases which will be related at the end of this chapter.

I am happy to find that the testimony which, from time to time, I have published regarding the efficiency and safety of the application of potassa fusa to urethral strictures, has led to its employment

by some of our best practical surgeons; and I entertain not the slightest doubt, that it will, at no distant period, be regarded as one of the most valuable therapeutic agents in that disease.

Amongst those gentlemen who, from my recommendation, have employed the caustic potash in the more intractable forms of urethral stricture, I have much satisfaction in naming Professor Lizars as one who, on several occasions, has expressed a very strong opinion of its merits, after having had ample opportunities of testing the value of the remedy.

Besides the record of the high estimation in which he holds the remedial powers of the potassa fusa in bad cases of stricture, contained in his "Practical Observations on Stricture," Professor Lizars thus expresses himself on the subject in a letter addressed to the editor of *The Medical Times and Gazette*, in the number of that Journal of April 29, 1854:—

"Sir,—In the number of your widely-circulated Journal for April 15, 1854, Mr. Wade makes some 'Explanatory Observations on the Treatment of Urethral Stricture.' The superiority of the potassa fusa, in my opinion, over the perineal section, is established to the satisfaction of every candid mind, both in effecting the removal of stricture, without injurious or fatal consequences, and in more certainly preventing recontraction."

In these days of "conservative surgery," it may be worth asking, how far the employment of caustic potash, as a substitute for the knife, may be regarded as entitled to any honour in this question? If an operation is the opprobrium of surgery, any remedy which prevents the necessity of such operation, is, at all events, "conservative."

I leave others to determine how far the potassa fusa answers the purpose for which it is intended as a "conservative" agent.

CASES.

CASE 1.—*Irritable Stricture in which the introduction of Instruments caused great Constitutional Disturbance.*

G. R., aged 47, residing at No. 26, Gibraltar-row, West-square, Lambeth, admitted a dispensary patient, October 5th, 1839, with stricture of the urethra of many years' duration. His urine had long been voided with difficulty, frequently stopping suddenly, then passing by drops, and for the last two months it has been constantly dribbling away night and day. He has been under surgical treatment many years, and he informed me that a No. 6 steel sound is the largest-sized instrument that has been passed for him, a considerable degree of force having been always required before it could be got through the stricture, which invariably bled freely afterwards. Severe constitutional disturbance always succeeded the introduction of instruments, the patient usually suffering from vomiting and purging for twenty or thirty hours afterwards. On examination, a stricture was discovered at 4½ inches from the orifice of the urethra, which was highly irritable, and bled freely on very slight pressure. A No. 6 bougie, armed with potassa fusa, was applied to the stricture for about two minutes; and was again used on the 10th. On the 26th a No. 6 bougie was passed into the bladder without any hæmorrhage. 29th.—No constitutional disturbance or other ill effects succeeded, as formerly, the introduction of the bougie; and the patient says he is better than he has been for many years. Dec. 17th.—The man having been unable to attend since the 29th of October, I attempted to pass a No. 6 bougie, but without success. The potassa fusa was consequently applied, when, after about half a minute's pressure, the armed bougie passed through the stricture, and was of course instantly withdrawn. A No. 6 common bougie was immediately afterwards passed with facility, and retained a quarter of an hour. On the 2nd of January, 1840, a No. 9 elastic gum catheter, without its stilet, was readily introduced, and on the 15th a No. 10 bougie was as readily passed.

CASE 2.—*Impassable Stricture.*

C. F., aged 40, admitted a dispensary patient, June 4th, 1840, with stricture of the urethra. His urine has long been passed with great difficulty, and the stream is very minute and divided. Abscesses have occasionally formed in the perineum, but without leaving fistulous openings. On exami-

nation, a stricture was discovered at six inches, which bled from very slight pressure with a No. 2 bougie, which could not be made to enter the obstruction. After three applications of the potassa fusa, a No. 2 bougie was passed into the bladder without any bleeding. No further application of the potassa fusa was required, and in three months the stricture was sufficiently dilated to admit the introduction of a No. 12 steel sound.

CASE 3.—*Irritable Stricture.*

G. T., admitted a dispensary patient, Feb. 25th, 1840, with stricture of the urethra. His urine is passed with much difficulty, the stream being very small, frequently stopping and coming away by drops. On examination, a stricture was discovered at six inches, through which a No. 2 plaster bougie was passed with some difficulty. The man called at my house late in the evening, having been unable to pass any urine since the introduction of the bougie in the morning. No catheter could be passed; but the point of a No. 2 bougie was, after a little pressure, made to enter the stricture, and, when it was withdrawn, the urine followed in a very small stream. Feb. 27th.—As the urine had been dribbling away constantly since his last visit, the potassa fusa was applied to the stricture, and, immediately after the bougie had been withdrawn, the man made water more freely than he had done for a month previously. Leeches were applied to the perineum, and the bowels well opened; after which the patient was ordered to take five grains of Dover's powder and ten of carbonate of soda three times a day. The potassa fusa was again applied on the 29th of February, and on the 3rd of March. March 5th.—The stream of urine has much improved since the application of the potassa fusa. A No. 4 bougie was passed into the bladder. The stricture gradually yielded without any further application of the potash, so as to admit, on the 9th of June, the introduction of a No. 8 steel sound, at which time the patient was obliged to go into the country. He, however, returned to the dispensary, when I again had recourse to potassa fusa with great advantage.

CASE 4.—*Impassable Stricture.*

J. W., aged 36, residing at No. 16, Archer-street, admitted a dispensary patient, March 24th, 1840, with stricture of the urethra. This man has had an occasional gleety discharge, with difficulty in passing his urine, for the last two years. On examination, an impassable stricture was found at $6\frac{1}{2}$ inches. After three applications of the potassa fusa, a No. 2 silver catheter was passed into the bladder. The stricture gradually yielded without any further use of the potash, and was sufficiently dilated by the 29th of August to admit the introduction of a No. 12 steel sound.

CASE 5.—*Impassable Stricture.*

J. H., aged 30, admitted a dispensary patient, June 25th, 1840, with stricture of the urethra. His urine is passed with great difficulty, either by drops or in a very fine stream, and the man is obliged to rise during the

night to make water. On examining the urethra, an impassable stricture, which bled freely on slight pressure, was discovered at 5½ inches. After three applications of the potassa fusa, a No. 2 silver catheter was passed into the bladder. No return of bleeding from the pressure of the bougie occurred after the first application of the potash. The stricture gradually yielded so as to admit, by the 20th of September, the introduction of a No. 11 steel sound. During the process of dilatation, in consequence of occasional irritability, the stricture was touched two or three times with the potassa fusa.

Case 6.—*Irritable Stricture.*

E. C., aged 31, residing at No. 11, St. Ann's-court, admitted a dispensary patient, June 3rd, 1840, with a stricture of the urethra. This man has been many years affected with stricture, and has latterly passed his urine with great difficulty. After considerable perseverance, I succeeded in getting a No. 2 silver catheter into the bladder. The stricture, which was at the posterior part of the bulb, felt hard and rugged, and bled rather freely. June 28th.—A No. 3 catheter was passed with difficulty, being very firmly grasped, and when withdrawn was followed by a little blood. July 2nd.—The No. 3 catheter could not be made to enter the stricture; the potassa was therefore applied, and was again repeated at the end of three days. After this time no further difficulty was experienced in the dilatation of the stricture, which, on the 10th of August, admitted the introduction of a No. 10 steel sound. The man's attendance at the dispensary has since been so irregular, that no attempt has been made to increase the size of the instrument.

Case 7.—*Impassable Stricture.*

J. S., aged 43, admitted a dispensary patient, November 20th, 1839, with stricture of the urethra, accompanied by a slight gleety discharge. The urine was passed with great difficulty, the stream being very small and divided. On examination, an impassable stricture was discovered at seven inches, which bled on slight pressure from the bougie. After four applications of the potassa fusa, a No. 2 silver catheter was passed into the bladder. No further application of the potassa was required, and by February 11th, 1840, the stricture was sufficiently dilated to admit the introduction of a No. 12 steel sound.

Case 8.—*Impassable Irritable Stricture.*

R. T., aged 32, admitted a dispensary patient, April 16th, 1840. This patient first observed a difficulty in passing his urine twelve months ago, which difficulty has gradually increased to the present time, and it is now voided only by drops, with great pain. Before his application at the dispensary, he applied to a surgeon, in consequence of retention of urine. An unsuccessful attempt was made to pass a catheter which could not be made to enter the stricture. According to his account, he lost a considerable

quantity of blood, which, with the medicines that were given to him, afforded slight relief, the urine passing again by drops as before. A second attempt was made to pass a catheter, which was also unsuccessful, and caused a greater loss of blood than the first. He then came to the dispensary, and, on examination, an impassable stricture was found at 5½ inches, which bled from very slight pressure. The potassa fusa was applied to the stricture; leeches were directed to be put on the perineum, which was subsequently to be well fomented. The bowels were freely opened, and, afterwards, five grains of Dover's powder and ten of carbonate of soda were ordered to be taken three times a day. It required sixteen applications of the potassa fusa before any instrument could be passed, when, with some difficulty, a No. 2 silver catheter was got into the bladder. The stricture was long and very hard, feeling like cartilage, and the catheter was firmly grasped.

In this case, as in many others, I regretted exceedingly that the patient's necessary avocations would not permit me to leave the instrument in his bladder. This stricture was so irritable and unyielding, that, with great difficulty, it was sufficiently dilated by the 16th of July to admit the introduction of a No. 6 steel sound, and it has been necessary to have recourse to the potassa fusa occasionally, which has invariably afforded great relief. I have not yet been able to get beyond a No. 6; for whenever an attempt has been made to pass a No. 7, so much local irritation, accompanied by severe rigors, ensued, that matters were rendered worse for a time. The patient now passes his water in a very good stream, but cannot bear the introduction of a larger-sized instrument than No. 6. This was a case in which the retention of a catheter in the bladder would, in all probability, have been attended with good effects; but such a practice could not be pursued, as the patient was obliged to earn his living, and had to stand the greater part of the day.

Case 9.—*Impassable Stricture, with Fistulæ in Perineo.*

C. R., aged 42, residing in Monmouth-street, admitted a dispensary patient, December 14th, 1839, with stricture of the urethra, and three perineal fistulæ, through which the greater part of the urine is passed. About six years ago he first observed some difficulty in making water, which, from that time, so much increased, that in five months afterwards the man was admitted into St. Bartholomew's Hospital with retention of urine, which was succeeded by rupture of the urethra. Free incisions were made, and he was enabled in three months to leave the hospital. For two years after the rupture of the urethra, the patient was able to pass his water in a very small stream; but was obliged, some time afterwards, to return to the hospital with retention of urine and a swelling in the perineum. A free incision was made, and the urine escaped through the opening. Since the last incision, the greater part of the urine has come away from fistulous openings in the perineum, and is at present passed in a very small stream, chiefly by the fistulæ. A great number of unsuccessful attempts have been made to get an instrument into the bladder. On examination, the smallest

sized bougie was stopped at six inches, and could not be made to enter the obstruction. The bowels were freely opened, and leeches applied to the perineum; after which five grains of Dover's powder, with ten of carbonate of soda, were ordered to be taken every four hours. Severe rigors occurred after the examination of the urethra, which the patient informs me has been the case for some time past, whenever attempts have been made to pass an instrument. The potassa fusa was applied to the stricture, and its application repeated on the 21st, the 24th, and 26th. The report on the last day states that the urine passed in an improved stream by its natural channel. The potassa fusa was repeated on the 28th and 31st. On the 2nd of January, 1840, a No. 2 silver catheter was passed into the bladder with some little difficulty; and when it was withdrawn, about a tea-spoonful of blood escaped. The man's avocations would not permit me to leave the catheter in the bladder. January 5th, a No. 3 silver catheter was passed, and on the 8th a No. 4 was introduced after considerable perseverance, the instrument having been very firmly grasped by the stricture. February 11th.—The stricture admits, with difficulty, the No. 4 silver catheter; but the stream of urine has much improved, and the fistulæ are nearly closed. In consequence of the irritability of the stricture, and the frequent occurrence of rigors after the introduction of instruments, the potassa fusa was again applied. February 13th.—No rigors occurred from the application of the potassa fusa, which was repeated this day, and also on the 16th and 20th. On the 24th, a No. 4 plaster bougie was passed without difficulty into the bladder. March 5th.—No irritation succeeded the last introduction of the bougie; but on attempting to introduce a No. 5 this day, the instrument was so firmly grasped by the stricture, that it could not be passed on into the bladder. As the strictured portion of the urethra felt hard and rugged to some extent, the potassa fusa was applied. March 7th.—A No. 5 bougie was passed to-day; and on the 18th, the same sized silver catheter was introduced. The stream of urine has greatly improved, and the patient is obliged to rise during the night to make water, which he did not do formerly, as the greater part dribbled away by the fistulous orifices. A considerable muco-purulent discharge occurring at this time, the urethra was left undisturbed until June 6th, when a No. 6 steel sound was passed into the bladder. From this time no further difficulty occurred, the stricture gradually yielding so as to admit, by August 15th, the introduction of a No. 11 steel sound. A probe armed with nitrate of silver was introduced two or three times into one of the fistulæ which did not seem disposed to close. The fistulous openings are now all closed, and the patient comes to the dispensary occasionally to have a bougie passed.

CASE 10.—*Old Stricture impervious to Instruments, with a false passage.*

Mr. D., about 50 years of age, applied to me, May 4th, 1841. He had long experienced great difficulty in passing his water, having had stricture for twenty years. He told me that no instrument had been ever got into his bladder, notwithstanding a great many attempts to effect that object had been made, and that he was sure he had a false passage. On examin-

ing the urethra with a No. 2 silver catheter, it was stopped at 6½ inches, very slight pressure having caused free bleeding.

May 6th.—On introducing a No. 3 bougie to mark the exact distance of the stricture, before applying the potassa fusa, I found that it readily passed to eight inches, and that the instrument was not grasped. Feeling convinced that the false passage had been entered by the bougie, it was immediately withdrawn, and one more curved used. Keeping this well to the upper surface of the urethra, it was stopped at 6½ inches as at first. I ascertained that the false passage commenced at the lower part of the stricture, taking its course along the right side of the urethra. I applied the potassa fusa very carefully; and after the second application, a No. 3 bougie advanced half an inch into the stricture, being there firmly grasped. It required fifteen applications of the potassa fusa before a bougie could be passed into the bladder. The stricture, which at first bled freely on slight pressure with the bougie, ceased to do so at all after eight applications of the potassa fusa, the stream of urine having begun to improve after the fifth. The stricture soon became sufficiently dilated to admit a No. 8 bougie, when the patient discontinued his attendance. Notwithstanding the greatest care was taken to avoid such an occurrence, the bougie two or three times entered the false passage, but was, of course, instantly withdrawn.

Case 11.—*Irritable Hæmorrhagic Stricture.*

A gentleman, 40 years of age, applied to me on the 1st of April, 1841. He had been troubled with a stricture of the urethra for several years, accompanied with occasional attacks of retention of urine, which were invariably relieved by the introduction of a small bougie. On examination, I found an obstruction at the bulb, through which, after a little pressure, a No. 6 bougie passed into the bladder. From the patient's urgent desire to pass his water, the bougie could not be retained more than two minutes; and, when it was withdrawn, about a tea-spoonful of blood followed; a similar discharge having occurred whenever instruments had been introduced. The application of leeches to the perineum, and the exhibition of antispasmodic medicines, had no effect in diminishing the irritability of the stricture. After several unsuccessful attempts to dilate the stricture with the common bougie, its extreme irritability not admitting a larger size than No. 6, my patient at length permitted me to use the potassa fusa, to which he had previously objected. Three days after the first application of the potash, a No. 6 bougie was passed with much less pain than before, and was retained for ten minutes. After four more applications of the potassa fusa, at intervals of four days, a No. 8 bougie could be readily passed without subsequent hæmorrhage or irritation. As the stricture from this time readily yielded, admitting a larger bougie at each successive introduction of the instrument, until one of full size could be passed without the slightest difficulty, there was of course no advantage in the further application of the potassa fusa. I may add, that the remedy had so entirely removed the irritability of the stricture, as well as its disposition to bleed, that latterly, the bougie was retained half an hour without causing any uneasiness.

CASE 12.—*Stricture from injury of the Perineum, impassable to Instruments.*

R. B., Esq., 45 years of age, applied to me in October, 1841. He had been a great sufferer from stricture of the urethra, which he attributed to an injury of the perineum, received at College whilst playing at foot-ball. This gentleman had long passed his urine with extreme difficulty, and was very much depressed from the supposition that his disease was irremediable. He had been under the care of a relative, who had for five months persevered in attempts to relieve him, but could never succeed in passing the smallest bougie. On examination, I found the urethra to be highly sensitive, and the smallest bougie was stopped at four inches. I at once applied the potassa fusa; and after four applications, a No. 3 bougie was passed on to six inches, but could not be made to advance further, being very firmly grasped. This stricture, which was very irritable, required several careful applications of the potassa fusa before it yielded sufficiently to allow a No. 4 bougie to pass on into the bladder. The stream of urine had much improved after the third application of the potash to the second stricture. This gentleman could not remain under my care for more than six weeks, being obliged to return to his residence at a considerable distance in the country. When he left me, I could pass a No. 8 bougie; and, as he had a small urethra, I did not advise him to increase the size of the instrument beyond a No. 9. Being desirous to ascertain this patient's present state, I wrote to him; and, in answer to my letter, he informed me, in a note dated March 21, 1849, that he had never experienced any inconvenience in passing his water since he was under my care, but that he occasionally passed a No. 8 bougie.

CASE 13.—*Impassable Stricture.*

J. F., aged 35, applied at the dispensary on the 28th February, 1843. Has long suffered from a difficulty in passing his water, having been latterly disturbed several times during the night, as well as day, from an urgent desire to empty his bladder. The urine now comes away by drops, or in a very fine stream. Rigors frequently occur. Several unsuccessful attempts have been made at various times to pass a bougie, which attempts, it appears, invariably caused pain and a free discharge of blood. On examination, a stricture was detected at $4\frac{1}{2}$ inches impassable to the smallest bougie, very gentle pressure causing a little oozing of blood. I applied the potassa fusa on the 2nd of March, and, after three applications, a No. 3 bougie was passed into the bladder. At the end of a month, the stricture admitted the introduction of a No. 8 bougie, and the man considered himself so well, that he did not continue his attendance at the dispensary. This case is an example of many others, in which patients, especially of the poorer classes, suffering from strictures, as soon as they are sufficiently relieved so as to be able to pass their water in a fair stream, discontinue their attendance upon the surgeon.

Case 14.—*Irritable Stricture.*

Mr. W., of middle age, had long suspected that he had stricture of the urethra, having for some length of time observed yellowish spots upon his linen; also, that he occasionally passed his urine with a little difficulty. He had felt at times an aching pain in the perineum; but from the gradual diminution in the stream of urine, was not aware that it was much smaller than in the healthy state. With some slight difficulty, on the 27th of January, 1845, I introduced for this gentleman a No. 4 bougie. There was a stricture at the bulb half an inch in length. Finding, from the irritability of the stricture, that no progress had been made, on the 13th of February I applied the potassa fusa, and repeated the remedy on the 15th, 17th, 19th, and 21st, when I could pass a No. 6. The urethra was now left quiet for several days.

March 1st.—As the No. 6 bougie entered the stricture with rather more difficulty than when last used, and the gentleman being very anxious to get entirely rid of his disease, having no fear of the remedy, I applied the potassa fusa more freely, passing the armed bougie slowly backwards and forwards along the obstruction. The only inconvenience caused by this application was a severe scalding pain felt by the patient when first passing his water afterwards, and a slight bloody mucous discharge, which continued for ten days. At the expiration of that time, the stream of urine had greatly improved. No attempt was made to pass a bougie until all urethral irritation had subsided, when a No. 8 was easily introduced. The stricture appeared to have been completely removed by the last application of the potassa fusa, as no difficulty was subsequently experienced, the size of the instrument having been gradually increased to a No. 16 silver sound. I have seen this gentleman frequently, and it is his conviction that the obstruction was entirely removed by the last rather free application of the potassa fusa. He, however, occasionally passes the No. 16 sound.

Case 15.—*Irritable Stricture removed by the potassa fusa after failure with the nitrate of silver.*

T. R., Esq., about 30 years of age, residing in the country, first applied to me April 20, 1848, having been, for some time past, much troubled with a stricture of the urethra. Has had gonorrhœa three times, and dates the origin of his present complaint to the last attack, which he endeavoured to cut short by a strong nitrate of silver injection, made with a scruple of the salt to an ounce of water. He used the injection frequently, but did not continue it more than two days, from the severe pain and scalding that ensued. His disease was not cured by this remedy; indeed he has never since been entirely free from a gleety discharge. It was about eight months after the commencement of the last gonorrhœa, that he first observed a diminution in the stream of urine, to which, however, he paid no attention for twelve months, when his surgeon succeeded, with some difficulty, in passing a No. 5 silver catheter into the bladder. The introduction of the instrument caused much pain, and was followed by a little bleeding. The stricture was

at length dilated by the plaster bougie sufficiently to admit a No. 13, but the introduction of the latter caused severe pain and a discharge of blood. To remove the irritability of the stricture, and to stop the gleety discharge, the nitrate of silver was applied six times, with Lallemande's instrument, at intervals of five days, the first application having been made on the 20th of December, 1847. The caustic did rather harm than good, as No. 10 is the largest-sized bougie which has been passed since its use. It should be stated, however, that although a No. 13 had been passed two or three times, that size could not be gone on with, as the stricture became so irritable for some time afterwards, as to admit with difficulty the introduction of a No. 6 or 8. Under these circumstances, the gentleman, by the advice of his medical attendant, consulted me.

On the 20th of April, 1848, I passed, with a little resistance, a No. 8 silver sound through a stricture at five inches. On the following evening a No. 6 could not be passed with any moderate pressure; I therefore at once applied the potassa fusa.

22nd.—The armed bougie was passed slowly backwards and forwards through the stricture, which was about half an inch long, and felt hard. The potassa fusa was applied daily until the 27th, when a No. 11 silver sound was passed with facility. The stricture now readily yielded, and on the 7th of May I was able to pass a No. 14 sound, which was the full size of the urethra. The application of the potassa fusa affording so much relief, and time being a great object with my patient, I did not hesitate to use the potash daily. The gleety discharge had almost entirely disappeared until the introduction of No. 14, which appeared to cause it to return slightly. Scarcely any pain on micturition was experienced during the treatment; a circumstance which very much surprised the patient, who had suffered so much in that respect after the application of the nitrate of silver. When this gentleman left town, on the 12th of May, the morbid tissue forming the stricture appeared to have been removed, as no difference, when passing the sound, was felt between the part which had been obstructed, and the other portions of the urethra.

CASE 16.—*Return of an Impassable Stricture from discontinuing the use of the bougie before the disease had been half cured.*

T. W., aged 49, formerly under my care, applied to me again on the 25th of July, 1848. He is now able to pass his urine only by drops, and often with great straining, being obliged to rise several times during the night, from an urgent desire to empty his bladder. I learned that he continued to pass his water very well until four years ago, when he observed a slight difficulty in that act, which has been gradually increasing to the present time. Being unable to get a bougie beyond 6½ inches, I at once applied the potassa fusa, and on the 27th repeated its application.

July 29th.—The urine having been passed during the last two days in a very small stream, the potassa fusa was applied.

August 1st.—The stream of urine has considerably improved, and the man was not obliged to rise to empty his bladder last night. I had no difficulty in passing a No. 3 bougie.

September 5th.—The size of the bougie has been gradually increased to No. 9.

October 14th.—Not having been able to get beyond the No. 9, I applied the potassa fusa to-day.

Dec. 18th.—A No. 12 was passed with facility, that being the full size of the urethra. This man has since occasionally attended at the dispensary to have the No. 12 passed.

Case 17.—*Impassable Stricture.*

Mr. C. S., aged 34, residing in Gresse-street, admitted a dispensary patient, July 18, 1848. He has, for several years, suffered much from a difficulty in passing his water. The stream is very small, and at times there is great straining before a drop can be passed; and so considerable are the efforts required to effect the expulsion of the urine, as to cause a discharge of blood. There is seldom more than half a teacupful of water passed at one time; and on some occasions, when unable to expel any, he has succeeded in effecting his object by the application of hot fomentations. This man had been an out-patient at a hospital, and the surgeon to the institution having failed in many attempts to pass an instrument, told him that his only chance of relief was to have an operation performed for the division of his stricture, and wished him to enter the house at once. Under these circumstances, he was advised by a friend to place himself under my care. He attributes his stricture to gonorrhœa, having had that complaint three times; the last having been very protracted. He has for some time past had more or less gleety discharge, and is troubled with a desire to pass his water almost every hour, being obliged to rise several times during the night for that purpose. His general health has become much impaired, and he suffers greatly from pains in his loins and thighs. On examination, I found a stricture at the commencement of the membranous portion of the urethra, which bled on very slight pressure, and the point of the instrument could not be made to enter the obstruction. As the stricture had latterly been much irritated by attempts to pass instruments, I thought it best to endeavour to relieve the irritation, by the application of leeches to the perineum, warm fomentations, &c., before resorting to the caustic potash, which was used on the 22nd, the result being the discharge of a few drops of blood, and a sense of scalding when the urine was first passed after its application. The potassa fusa was again applied on the 24th; and on the 27th I succeeded in passing a No. 3 bougie into the bladder.

August 3rd.—Not being able to pass the No. 3 bougie to-day, I applied the potassa fusa.

August 7th.—Applied the potassa fusa. The stream of urine has considerably improved, and he has not been disturbed, during the last two nights, by any desire to empty his bladder.

August 9th.—Passed a No. 5 bougie into the bladder.

September 27th.—As the stricture continued unyielding to the common bougie, not admitting one larger than No. 7, which was firmly grasped, I

again had recourse to the caustic potash. The gleety discharge has nearly disappeared, and there is no remaining difficulty in micturition. There was no occasion for any further use of the potassa fusa, as the stricture gradually yielded so as to admit, on December 1st, of the introduction of a No. 12. I have not increased the size beyond 13, as that is as large as the urethra. The patient comes to me about once a fortnight, when I pass for him the No. 13, without the slightest difficulty, but the thickened tissue is not yet entirely removed, and it will be necessary for him to continue the regular use of the bougie for some length of time. I have alluded to the proposed operation for division of the stricture in this case, as illustrative of the power of the potassa fusa, and not to intimate any superior skill on my part, as, had it not been for that remedy, I could not have succeeded, any more than others, without recourse to the knife. I have been equally successful in the use of the caustic potash in many similar cases where the operation for division of the stricture had been proposed by other surgeons.

CASE 18.—*Impassable Cartilaginous Stricture of long duration.*

At 2 P.M., on the 12th of January, 1849, I was requested to see L. W., Esq., of middle age, who was in great suffering from retention of urine. He had passed only a few drops of water for the last twelve hours, and appeared to be greatly alarmed at his situation, from his knowledge of the impossibility of obtaining relief by the introduction of the catheter. He had strictures of many years' duration, which had caused several attacks of retention of urine, the first of which occurred ten years ago. These attacks were generally treated by full doses of opium, from which formerly he soon obtained relief; but latterly, his sufferings, on such occasions, had been very great, from the long continuance of the retention. From the repeated unsuccessful attempts that had been made by several surgeons to get an instrument through the stricture, he strongly objected to my making any effort of the kind for his relief, and assured me that such practice had, on similar occasions, only added to the irritation of a highly irritable stricture. He was at length persuaded to permit me to introduce a No. 2 plaster bougie, which was stopped by a stricture 4½ inches; but after a little pressure, the instrument passed on to a second obstruction at six inches. I succeeded in getting the point of the bougie into the second stricture, where it was kept until the expulsive efforts of the bladder became very urgent, and then, on its having been withdrawn, nearly half a pint of urine came away, at first by drops, but afterwards in a small stream. The patient had taken a full dose of liq. opii sedativ. an hour before my visit, and the same quantity was ordered to be repeated in a short time.

At half-past 8 P.M., no urine having been passed since my visit, I again introduced the small bougie with the same result as before.

I was called up at 5 A.M., January 13, and repeated the operation with a similar result. An ounce of castor oil, which had been taken at bed-time, not having operated, the dose was repeated. As this gentleman had never found any benefit from the application of leeches to the perineum on former similar occasions, they were not used on the present.

Jan. 13th, 11 A.M.—No urine having been passed since the introduction of the bougie early in the morning, I repeated the operation, using this time one of catgut, and allowed it to remain for ten minutes, when, on its being withdrawn, about half a pint of water came away, in rather a better stream than previously.

7 P.M.—The patient was quite comfortable, having been able to pass his water during the afternoon without assistance.

Jan. 14th.—The potassa fusa was applied to the first stricture, causing a slight sensation of scalding when the urine was first passed, as well as the discharge of three or four drops of blood.

15th.—The potassa fusa was again applied with a No. 6 bougie, which entered a quarter of an inch into the stricture. When the bougie was withdrawn, its point was covered with a little bloody mucus, and a slight burning pain was felt for a few minutes. No irritation having ensued, the application of the potassa fusa was repeated on the 16th, 17th, and 18th; on which day the armed bougie passed through the first stricture to the second, where it was retained. No bloody discharge had followed the three last applications of the caustic.

19th.—The armed bougie was applied to the second stricture, which it entered about the eighth of an inch. In the evening I found that the result of the morning's operation had been a severe spasmodic pain in the perineum, which lasted about ten minutes, until the discharge of a few drops of blood afforded complete relief. Mr. W. had suffered much formerly, at various times, from this kind of pain. An opiate draught was directed to be taken at bed-time. All irritation having subsided, the potassa fusa was again applied, at 11 A.M., on the 22nd, and the bougie went a little further into the stricture. 7 P.M.—The urine had been only once passed, and that with scarcely any pain, since the application in the morning.

29th.—The potassa fusa has been applied every day, no irritation of any consequence having ensued. On two occasions three or four spots of bloody mucous discharge appeared upon the linen. The bougie has perceptibly advanced after each application, and the stream of urine is a little improved. The irritability of the bladder has nearly subsided, the urine now requiring to be voided but once during the night.

Feb. 13th.—The armed bougie has been used every day except on the 2nd, when it was omitted in consequence of a slight return of the spasmodic pain. The stream of water has much improved during the last two days, and, with the exception of yesterday, there has been no coloured discharge since the 29th of January. After the use of the potassa fusa to-day, with a No. 6 bougie, a No. 4 was passed into the bladder, the last stricture having required twenty-seven applications before the bougie could be passed through it. The urethra, at the last stricture, for two inches, appeared to be of a cartilaginous hardness, and the daily use of the armed bougie caused but little irritation.

15th.—After having passed a No. 4 bougie into the bladder, I applied the potassa fusa with a No. 5, gently moving it backwards and forwards over the whole strictured surface. The potassa fusa was used daily until the 2nd of March, by which time the stricture had become sufficiently dilated to admit of the introduction of a No. 8 bougie into the bladder. The water

was passed in a very good stream, and with scarcely any hesitation, or indeed difficulty of any kind. My patient was now obliged to return into the country, much to my regret, as the stricture still felt very hard, and there was much left to be accomplished. He intended to continue the treatment himself, but promised me to apply at once to the surgeon who had previously attended him, should any difficulty arise. This he did, and I received, on the 29th of April, a very satisfactory letter from that gentleman, informing me of the great advantage his patient had derived from the use of the potassa fusa. It will be seen that in this case I used the armed bougie every day with but few exceptions. Although, from the hard and insensible nature of the stricture, no irritation worth mentioning resulted, if my patient's time had not been of great consequence to him, I should not have applied the potassa fusa oftener than every second or third day. This case, therefore, must not be considered as a precedent for a similar practice. This gentleman's brother died of neglected stricture of the urethra. It has so frequently happened to me to have had brothers under my care with this affection, that I have thought the disease must be hereditary in some slight degree.

Case 19.—*Irritable Stricture.*

Mr. G., about 40 years of age, first applied to me late in the evening of March 14th, 1849, having suffered acutely for several hours, from retention of urine. This was not his first attack of retention; and he had long experienced more or less difficulty in passing his urine. He thinks his disease has been of more than twelve years' duration. I succeeded in introducing into the bladder a No. 2 gum catheter, which was stopped by a stricture at 6½ inches.

15th, 8 P.M.—Has passed some urine with difficulty during the night and in the early part of the morning, but has been unable to void any for several hours. With a No. 3 gum catheter, which was firmly grasped by the stricture, I drew off about sixteen ounces of urine.

16th, 8 P.M.—Has had no retention, but his urine has been passed with considerable difficulty, by drops, and in a very small stream. A No. 3 plaster bougie was passed, and allowed to remain for a few minutes; when withdrawn it was followed by a few drops of blood. In an attack of retention, a few days before his application to me, this gentleman had applied to a surgeon, who had passed, with much difficulty, a small silver catheter, which caused great pain and considerable hæmorrhage.

18th.—The urine has been passed during the last twenty-four hours with difficulty, and there was so much spasm this evening that the No. 3 bougie could not be passed; I therefore applied the potassa fusa.

22nd.—Passed a No. 3 silver catheter.

25th.—Not being able to introduce the No. 3 catheter, I again used the potassa fusa.

28th.—The stream of urine has considerably improved. The potassa fusa was applied, the armed bougie having been passed backwards and forwards along the strictured portion of the urethra, which appeared to be of considerable extent.

Finding, on the introduction of No. 5 gum catheter, that it was firmly grasped, I applied the potassa fusa as before. The last application of the caustic appeared so entirely to remove the irritability of the stricture, that there was no further indication for its employment; and, on the 7th of May, I was enabled to pass, with facility, a No. 12 sound. I have since passed a No. 13, which is of the natural size of the urethra. In this case, I believe that the stricture has been completely removed by the potassa fusa.

Case 20.—*Impassable Stricture.*

H. B., Esq., about 36 years of age, first applied to me October 8, 1849. He had long suffered from stricture. Two years before his application to me a very small silver catheter had been passed. The operation caused a little bleeding and severe pain, followed by considerable constitutional disturbance. This gentleman had been under the care of an eminent hospital surgeon, who made several subsequent attempts to pass an instrument through the stricture, but failed in all. The irritation of the bladder, in this case, was so great as to cause an almost irresistible desire of micturition nearly every hour, day and night. The urine was voided either by drops, or in a very minute stream, with much straining. On examination, I found a stricture at 6¼ inches, impassable to the smallest bougie, and which bled on being gently pressed by the instrument. I applied the potassa fusa, and repeated its application every second day. On the seventh application, made October 20th, the bougie, a No. 6, passed through the obstruction, which was more than half an inch in length, and felt hard and gristly. On my next visit (Oct. 22), an unarmed bougie of the same size was passed through the obstruction, but did not go on into the bladder. As the instrument was firmly grasped, I again used the potassa fusa. On my next attempt to pass a bougie, on the 24th, there was so much spasm, that the same sized instrument did not go through the stricture. I therefore applied the caustic, and repeated its application on the 26th and 29th. On the 31st, I introduced without difficulty a No. 6 silver catheter into the bladder. I had no occasion to use the caustic again, as the stricture readily yielded to the introduction of the sound; and on the 3rd of February, 1850, a No. 14, the full size of the urethra, could be passed with facility. The stricture, which, before the use of the potassa fusa, always bled more or less on pressure by the bougie, ceased to do so after the fourth application of the caustic, which also appeared to relieve, in a remarkable degree, the irritability of the bladder. This gentleman, who had occasionally suffered much from rigors, had only one attack during the treatment by potassa fusa. That attack occurred a few hours after the first introduction of an instrument into the bladder. I saw this patient a few days ago, when the No. 14 sound was passed with facility.

Case 21.—*Irritable Stricture.*

E. P., Esq., 33 years of age, consulted me on the 4th of February, 1850. This gentleman had been annoyed with very troublesome symptoms of

stricture for the last eight years, and had been for a long time under the care of an excellent surgeon, well conversant with the treatment of this disease, but who did not use caustic. This surgeon had occasionally succeeded in passing a small bougie into the bladder, but never could get beyond a No. 5. It usually happened that for some time after the introduction of a bougie, the stricture remained so extremely irritable as to be impassable to the smallest-sized instrument. The perineum had been freely leeched at various times; opiates by the mouth, also as suppositories, and in the form of enemata, had been used with but little benefit. The gentleman's health had suffered considerably, and, deriving no advantage from the means employed for his relief, despairing of improvement, he had given up all treatment fifteen months before his application to me, which was in consequence of an attack of retention of urine, from which he occasionally suffered. His urine had been passed for several months, either in a very small stream, or by drops. On examination, I found a stricture at four inches, impermeable by the smallest bougie, and which bled on very slight pressure. After three applications of potassa fusa, at intervals of three days, the bougie, a No. 5, passed through the stricture, and stopped at a second obstruction at 5½ inches. This second stricture was hard and gristly, having required seven applications of the caustic before a bougie could be passed through it. Three days afterwards I introduced with facility a No. 6 silver catheter into the bladder. No further application of potassa fusa was requisite, as the strictures readily yielded to the introduction of plated steel sounds; and, on the 24th of June, I passed a No. 12, the full size of the urethra, without being able to detect any hardness. This gentleman's principal urinary distress was evidently caused by the stricture nearest the external orifice of the urethra, as, after that had been subdued by the potassa fusa, he suffered no pain, and passed his urine in a better stream than he had for many months previously. I saw this patient a few weeks ago, and passed for him the No. 12. There does not appear to be the slightest disposition in this case to a return of the strictures; but, as a precaution, I have advised him to resort to the occasional introduction of the sound.

Case 22.—*Irritable Stricture.*

Captain F., aged 37, an officer of Dragoons, who had been several years in India, first consulted me April 16th, 1850. He had been a very great sufferer from stricture for the last twelve years, during which time he had been treated by different surgeons by the introduction of bougies and sounds. The passing of instruments, however, always caused so much irritation, that he derived but little benefit from their use. The gentleman who last attended him had succeeded occasionally in the introduction of a small steel sound; but the operation was always excessively painful, and followed by considerable hæmorrhage. No instrument had been passed for the last three years. The urine has long been voided with much difficulty, and latterly with very great straining; it usually passes by drops; and the attempts to empty his bladder, frequently continue for nearly half an hour at a time. For many years he has seldom been free from gleety discharge.

and micturition is attended with a severe scalding pain, affecting chiefly the first inch and a half from the external orifice of the urethra. Has had several attacks of gonorrhœa. The perineum has been freely leeched at times, but without affording him relief. I examined the urethra with a No. 3 plaster bougie, which stopped at two inches; a little pressure, however, caused it to advance another inch, when it was again arrested, but soon passed on to 5½ inches, where it was finally arrested by another obstruction. I applied the potassa fusa to the first stricture at two inches.

April 17th.—Applied the potassa fusa to the second stricture.

18th.—The gleety discharge has rather increased, and is coloured with blood. A No. 5 bougie was passed to the third obstruction at 5½ inches, to which I applied the potassa fusa.

19th.—Had a rigor this morning. The patient had formerly suffered greatly from rigors. The urine is passed with but little straining. A warm bath and an opiate were ordered.

20th.—Less irritation; the urine was voided in my presence in a continued stream. I passed a No. 4 plaster bougie into the bladder, but it was firmly grasped by the last stricture.

21st.—The urine is passed more freely and with less scalding. Captain F. said, he never experienced from any other treatment so much relief in so short a time. Applied the potassa fusa on a No. 6 bougie to the third stricture, which it entered.

22nd.—As there was rather more irritation than usual, the urethra was left undisturbed.

23rd.—The urine is passed better than it has been for several years. A No. 6 bougie passed through all the strictures. I applied the caustic on a No. 8 bougie, and repeated its application on the 27th. This gentleman was obliged to leave town unexpectedly the next day. He wrote to me from his residence in the country, not knowing how to proceed. I urged him to persevere in the use of the bougie. Being anxious to learn how he was getting on, I wrote to him in the early part of last August. In his reply he observes, "I can now pass a No. 9; the first stricture is gone, the others are better, as you may suppose, but not by any means well; still they are progressing." He added, that "he had been under the care of a great many professional men, but never received anything like the relief which he had done from the potassa-fusa treatment." This gentleman stated, on his first application to me, that it would be impossible for him to remain in town more than a fortnight, or I should not have applied the caustic at such short intervals. The applications, however, were very gentle ones, and did not cause much irritation.

Case 23.—*Irritable Stricture.*

Mr. C., about 36 years of age, applied to me, May 12th, 1850. Has had symptoms of stricture for the last twelve years. The difficulty of micturition has lately very much increased, and he now passes his urine with great straining in a very fine stream, or by drops. Attributes his complaint

to a protracted gonorrhœa. Examination disclosed a stricture at 5½ inches, through which I succeeded in passing a No. 1 bougie.

15th.—Has voided his urine with rather less straining. I could not pass the No. 1 bougie; and, having been equally unsuccessful on the 19th, I on that day applied the potassa fusa, which caused no pain, but only a slight sensation of heat.

22nd.—The urine has been passed better since the application of the caustic, and the irritability of the bladder, which previously caused him much annoyance, is greatly diminished. I first passed a No. 2 bougie easily into the bladder; and shortly afterwards a No. 5 as readily. I applied the caustic but once more, which was on the 26th, the stricture having become easily dilatable. On the 16th of June I could pass a No. 12 sound, the full size of the urethra, and there was then no sign of stricture. I have no doubt that the two applications of the caustic alkali entirely removed the stricture, which, although but of slight extent, had been attended with great suffering. It may be satisfactory to state, that I passed the No. 12 some time afterwards for this gentleman, when the urethra appeared to be quite healthy.

Case 24.—*Impassable Stricture.*

W. S. B., Esq., 32 years of age, residing in the country, first consulted me September 7, 1850, and gave the following account of his complaint:—"Between seven and eight years ago I first suspected myself to be affected with stricture, and applied to a surgeon, who, after passing a small bougie, told me I had two strictures. At first I thought myself benefited by his treatment, and for a time cherished hopes of a cure, but these hopes soon gave way. Although a tolerably sized bougie could be passed, it seemed to have no permanent effect in enlarging the stream of urine; often it was very tightly grasped, especially by the first stricture, and sometimes was with difficulty passed at all. At length I gave up attending the surgeon; and having derived no advantage from the use of the bougie, my strictures have ever since been left undisturbed." This gentleman's urine is passed with difficulty in a small forked stream. On examination with a No. 5 bougie, it was stopped by a stricture at 5¼ inches, to which I applied the potassa fusa, and repeated its application on the 9th and 10th. Before applying the caustic on the 11th, I examined the urethra with an unarmed bougie of the same size as had been previously used, when it passed through the stricture, and stopped at another 6½ inches from the orifice. As no irritation of consequence had been caused by the previous operations, I applied the potassa fusa to the second obstruction, which required three more applications before it became permeable. On the 15th, I passed a No. 7 sound into the bladder, having the day before failed in getting it through the second obstruction. The urethra, from the last stricture to the bladder, felt hard and rugged; it seemed as if the instrument passed over a ridgy surface at the inferior portion of the canal. The sound was retained for half an hour. I had no further difficulty in dilating the strictures, being able to increase the size of the sounds daily; and on the 21st, a No. 12, the full size of the urethra, was readily passed. The instruments were latterly

retained for nearly an hour, and scarcely caused any irritation. A little mucous discharge, slightly tinged with blood, was caused by the first three applications of the caustic. This gentleman could only remain in town for a fortnight, or I should have preferred proceeding more slowly; but there was fortunately no urethral irritation of importance during the whole treatment. The patient was desired to continue the use of the sound regularly for some length of time. The ridgy feeling behind the stricture had entirely disappeared, and the stream of urine was of a full size.

Case 25.—*Impermeable Stricture.*

J. L., aged 42, admitted a dispensary patient May 8, 1850. Has suffered much from stricture for the last twelve years, accompanied with more or less gleety discharge. During the last five years his urine has been voided with great straining, principally by drops, micturition usually occupying from a quarter to half an hour at a time. Has latterly been much annoyed by the urine dribbling away, especially when standing or sitting. Is seldom free for more than half an hour, day or night, from urgent calls to void his urine. This man had been for the last twelve months under the care of an excellent surgeon, who treated him chiefly by the steel sound. Upon only one occasion could any instrument be got through the obstructions, and that was about six months ago, when a very small steel sound appeared to enter the bladder. The operation caused severe pain, and rather free bleeding, followed by so much urethral irritation, that his sufferings were increased; and ever since, all attempts to pass an instrument through the first stricture have been unsuccessful. On examination, I found an impermeable stricture at $3\frac{1}{2}$ inches, to which I applied the potassa fusa, and repeated the application four times before a No. 5 bougie could be passed through the obstruction. There was another stricture at five inches, which required five applications of the caustic before the same sized bougie could be passed through it. On the 28th of June I was enabled to pass a No. 8 bougie into the bladder, and on the 6th of July a full-sized steel sound. There was no irritation of consequence from the application of the caustic potash. The man has since occasionally attended at the dispensary, when a No. 12 sound has been readily introduced.

Case 26.—*Impassable Stricture.*

C. B., aged 41, admitted a dispensary patient, July 8th, 1851. Has suffered several years from stricture. Four years ago, was two months in a hospital, when his surgeon, on one occasion, passed a No. 2 bougie into his bladder; but every subsequent attempt to introduce the bougie proved unsuccessful. No instrument of any kind has since been got through the stricture. His urine has long been voided with very painful straining, chiefly by drops, and he is much disturbed, night and day, with an almost irresistible desire to micturate. The attempts to pass instruments have mostly been followed by severe rigors. I found an impermeable stricture at $5\frac{1}{4}$ inches, and applied potassa fusa; repeating its application on the 10th

and 15th. On the 17th, the urine was passed with less straining, and sometimes, in a fine stream. Tried to pass a No. 2 bougie, but, being unsuccessful, applied potassa fusa. 19th.—The patient did not rise once last night to void his urine, which he says now passes better than it has done for several years past. Introduced a No. 3 bougie into the bladder; has had no irritation from the applications beyond a slight gleety discharge, nor has he had any recurrence of the rigors from which he formerly suffered so severely. 24th.—I saw the patient void his urine in a middle-sized stream. As there still existed considerable thickening at the seat of obstruction, I applied the potassa fusa, repeating its application on the 26th, 29th, 31st, and 2nd of August. I did not again use the caustic, as the stricture became easily dilatable, so as, very soon, to admit the introduction of a No. 12 sound, the full size of the urethra.

CASE 27.—*Impermeable Stricture of long standing.*

T. R., aged 64, admitted a dispensary patient, August 30th, 1851. Has been affected with stricture the greater part of his life, and has had several attacks of retention of urine. No instrument has been passed into his bladder for the last ten years. Is troubled with an almost constant dribbling of urine, which for a long time has been passed only by drops, with great straining. On examination, a stricture was detected at 6¼ inches, impermeable to the smallest instrument. Applied potassa fusa, and repeated its application, September 3rd, 6th, and 9th. On the 13th, the patient said that he had passed his urine in the morning in a small stream, it being the first time he had done so for many years. Did not apply the caustic, but introduced a No. 5 sound, which entered for about ¼ of an inch, a hard, gristly stricture. 16th.—Applied potassa fusa, and repeated its application on the 18th. Finding on the 22nd that the stream of urine had much improved, I tried a No. 6 sound, which, after a little gentle pressure, passed into the bladder. As the greater part of the bulbous portion of the urethra appeared to have been converted into a hard, irregular, gristly mass, I had recourse to six more applications of potassa fusa; and on the 15th of October I was able to pass into the bladder a No. 8 sound, which size has not been increased, as the man has naturally a very small urethra. In this case the stricture was highly sensitive; and, from the obstruction which the sound constantly meets with at the entrance to the bladder, there must be some little thickening or rigidity at that part. I can detect no enlargement of the prostate, and the patient has the power of completely emptying his bladder. As the man attends regularly at the dispensary, and passes his urine remarkably well, I have not thought it necessary to continue the use of potassa fusa, although there still remains much thickening at the seat of obstruction, which would, doubtless, recontract if it were not for the occasional introduction of a sound.

CASE 28.—*Irritable Strictures.*

C. C., Esq., aged 41, residing in the country, had for many years been a great sufferer from highly irritable strictures. He was very desponding,

having been under the care of several able surgeons, who had tried, in his case, the ordinary means of relief, including those by retention of the catheter, and the application of nitrate of silver. He did not think the nitrate of silver produced any good effects. Perineal section was at last proposed as his only remaining chance of relief. Before submitting to that operation, however, the gentleman was advised by his ordinary medical attendant to consult me, which he did, on the 25th of July, 1851. At this time micturition was accomplished with much difficulty, and the irritability of bladder was very great, it having been necessary for a long time past to exhibit opiates at bed-time to procure a tolerable night's rest. So great has latterly been the difficulty of micturition that it could seldom be effected unless the point of a No. 3 gum catheter, without its stilet, was previously introduced. On examination with the gum catheter—for the patient having suffered so much pain from the introduction of instruments, would not permit me to use any other instrument—an obstruction was met with at $4\frac{1}{4}$ inches, which was highly sensitive. As the urine was too acid, a draught containing ten drops of liquor potassæ, with the same quantity of tincture of hyoscyamus, in an ounce of camphor mixture, was ordered to be taken three times daily. On the 27th I applied the potassa fusa on a No. 3 bougie, which soon passed on to another obstruction at $5\frac{1}{4}$ inches. Both strictures were so sensitive, and the patient so extremely nervous, that the bougie was not retained in the urethra long enough for an efficient action of the potash. 29th.—Applied potassa fusa on a No. 3 bougie, not using a larger size, as I wished to avoid any distension of the strictures, which had always produced considerable irritation. This application, which was much more efficient than the first, caused merely a sense of heat. 31st.—Has had two good nights' rest, and less difficulty in micturition. August 2nd.—The irritability of the bladder has greatly subsided; applied potassa fusa to both strictures. 4th.—So much improved that the patient fancied himself "completely cured." Did not use the caustic, but passed a No. 5 bougie into the bladder. 6th.—Has not passed his urine so well since the introduction of the bougie. Has had no signs of urethral irritation beyond a few yellowish spots upon the linen since the first application of the caustic. Applied potassa fusa to the second obstruction, the first having been apparently removed. Repeated the application of the potash on the 9th, 12th, 15th, and 18th, when Mr. C. was obliged to return to the country for a short time. September 2nd.—Has had no difficulty of micturition during his absence; applied potassa fusa. 7th.—Passed a No. 6 bougie into the bladder, when a third obstruction, less sensitive than the others, but more rigid, was discovered at $6\frac{1}{2}$ inches. 9th.—Applied potassa fusa to the last stricture. The patient was conscious of the existence of the last obstruction, which, he told me, was always more irritated when stretched by the bougie, than were the other strictures. Mr. C. was obliged to leave town for a few days, and did not return until the 23rd, having passed his urine during his absence "better than for the last ten years." Applied potassa fusa to the second and third obstructions, and repeated its application on the 25th and 27th, when the patient again went into the country. On the 8th of October he returned much improved. Applied potassa fusa on the 12th, 14th, and 16th, when my patient finally left me for the country, at that time passing his urine as

well as he recollected ever to have done. These highly irritable strictures were, throughout my attendance, treated with the greatest gentleness. During the whole time Mr. C. was under my care he was actively employed, never having been confined to his room for a single day. There is, however, some thickening at the last stricture, and the patient will, probably, for some length of time, be subject to occasional attacks of irritation at that part, which may require a few more gentle applications of potassa fusa for their relief.

Case 29.—*Hard Irritable Stricture.*

C. ——, Esq., aged 41, residing about twenty miles from London, first consulted me on the 8th of September, 1851, having for the last fifteen years suffered greatly from stricture, which had caused frequent attacks of retention of urine; indeed, for some months past, micturition has seldom been effected without the previous introduction of a small bougie into the obstruction. The urine has for a great length of time been passed with considerable difficulty. The stricture is highly predisposed to spasm; a small bougie, No. 3, which can only occasionally be passed into the bladder, being very firmly grasped. Has been treated by dilatation in good hands; but none of his surgeons have been able to make further progress in his case than the introduction of a No. 5 bougie, which generally caused so much irritability of the stricture, that for some weeks afterwards, even the smallest instrument could not be passed. The irritability of bladder was considerable, the patient being harassed more or less constantly during the day, and his night's rest much disturbed by urgent inclination to pass his urine. The penis is considerably enlarged; and for the last two years the erections, which seldom occur, have been weak, whilst involuntary seminal emissions occasionally take place. On examining the urethra with a No. 3 bougie, I found, at seven inches from the meatus, a gristly sensitive stricture, about ¾ of an inch long, through which, after considerable pressure, the instrument passed on into the bladder. So great was the pain, and so urgent the desire of micturition, that I was very soon obliged to withdraw the bougie, which was strongly grasped, and was stained with bloody mucus. As the gentleman was obliged to return to the country immediately, I did not then apply the caustic, but prescribed some medicines to allay urethral irritation. As it was evident this was not a case to yield to dilatation, on the 27th I applied the potassa fusa, using a No. 3 bougie, which was passed backwards and forwards along the obstruction. Oct. 3.—A slight muco-purulent discharge succeeded the last application of the caustic. Applied potassa fusa, which caused merely a slight sense of heat. Repeated the application of potassa fusa, Oct. 7th, 15th, and 20th. On my patient's next visit, Oct. 27th, he assured me that since the last operation he had passed his urine better than for many years previously. Applied the caustic on a larger bougie, a No. 6, which passed backwards and forwards through the stricture, with but little grasping. As the stricture was still hard, I repeated the application of potash on the 3rd, 10th, and 17th of November. On the 2nd of December, the stream of urine had become of a good size,

the stricture admitting easily the introduction of a No. 8 bougie, with which the caustic was applied. Has had no irritation during any of the above applications, beyond an increase of his usual gleety discharge, which has occasionally been of a brownish colour. This gentleman has since come to me at uncertain intervals, varying from one to three or four weeks, having passed his urine remarkably well; and I can now introduce with facility a No. 11 bougie, with which size, or a No. 10, the application of potassa fusa has been continued, as the diseased tissue is not yet sufficiently removed to trust entirely to dilatation. The hypertrophy of the penis has nearly subsided, and the erections have improved in strength and frequency. The nocturnal seminal emissions seldom now occur.

Case 30.—*Irritable Strictures, attended with Spermatorrhœa.*

Sept. 12, 1851, I was consulted by Mr. B., about 50 years of age, formerly an officer in the army. This gentleman for the last twenty-two years had suffered considerably from strictures, which he attributed to a protracted gonorrhœa, attended with chordee. His strictures, three in number, one at 5, another at 6, and the last at $7\frac{1}{2}$ inches, have, in general, been very irritable, having caused several attacks of retention of urine and catarrh of the bladder. Although he had been able occasionally to pass a No. 10 elastic-gum bougie, its introduction always caused considerable urethral irritation, frequently attended with profuse gleety discharge. Latterly he has also been much harassed by spermatorrhœa, the seminal emissions occurring commonly as often as twice in the night. Under these circumstances, about twelve months ago, his surgeon was induced to apply the potassa fusa three times to all his strictures, and the applications, he said, afforded him wonderful relief, the caustic having, as it appears, completely removed the two first strictures, and nearly all urethral irritation; the seminal emissions now seldom occurring, and never oftener than once a month, I was consulted upon the propriety of any further application of the caustic potash, for which there did not appear to me to be the slightest necessity, as I was enabled, with facility, to pass a No. 11 silver sound into the bladder, there being merely a slight obstruction at $7\frac{1}{2}$ inches, which easily yielded to the instrument. I advised the patient to permit his surgeon to increase the size of the sound gradually to the full size of the urethral orifice, which appeared to be about that of a No. 14. I have related this case as a good illustration of the quick relief afforded by the application of potassa fusa to the urethral irritation and its dependent spermatorrhœa.

Case 31.—*Irritable Strictures.*

Mr. L., aged 38, first consulted me, Nov. 25, 1851. Had gonorrhœa ten years ago, and from that time has never been entirely free from gleety discharge. Six months after the occurrence of the gonorrhœa, he received a sharp blow upon the perineum. For the last seven years the urine has been passed with more or less difficulty. Has been under the care of several

surgeons. It was six months before the gentleman to whom he first applied could succeed in getting a No. 1 bougie into his bladder. After continued perseverance, and by placing the patient in a vapour-bath, previous to the introduction of the bougie, a No. 5 was eventually passed. That size, however, caused great irritation, and the patient, getting no better, afterwards went to other surgeons, having had the nitrate of silver applied by one of them; but none of them could succeed in passing for him a larger size than No. 5. Mr. L. is very desponding, having for some length of time despaired of obtaining further benefit from surgical treatment. In addition to the gleety discharge previously mentioned, his bladder is very irritable, his night's rest being much broken by the urgent desire of micturition, which cannot be effected without the previous introduction into the stricture of an elastic-gum bougie, which he always carries in his pocket. I found, on examination, an obstruction at $2\frac{1}{2}$ inches an inch long, and another, about the same length, at $5\frac{1}{4}$ inches, through which I had some difficulty in passing a No. 5 bougie, its introduction being very painful from the extreme irritability of the strictures. As this was evidently a case not to be further benefited by dilatation, I at once applied potassa fusa to the first stricture. November 27th.—Applied potassa fusa to both strictures. As the urine was too acid, some alkaline drops were prescribed. 29th.—Has passed his urine better. His usual yellow gleety discharge has been of a brownish colour. Applied potassa fusa to both strictures on a No. 6 bougie; after six more applications of the caustic to both strictures, a No. 10 bougie entered the bladder with facility. The patient voids his urine in a good stream, and all irritability of the bladder has subsided. There appeared to be no further necessity for applying the caustic, the stricture being soft and yielding. I advised the regular introduction of bougies. I heard from the patient afterwards, who informed me that he passed his urine in a free stream, and has had no difficulty in continuing the dilatation of his strictures.

Case 32.—*Hard Irritable Strictures.*

Mr. R. C., aged 45, first consulted me December 30th, 1851. Has been troubled for several years with more or less difficulty of micturition, which has latterly much increased. Fourteen months ago his surgeon succeeded in getting a No. 2 silver catheter into his bladder, but was never afterwards able to effect its introduction. He has at present a gleety discharge, with frequent micturition, disturbing him much during the night, and is a long time emptying his bladder. The stream of urine is small and uninterrupted. On examination, I found a stricture at $5\frac{1}{2}$ inches, and at length succeeded in passing a No. 2 plaster bougie into the bladder, which, on being withdrawn, was very firmly grasped and indented. On the patient's next visit, January 1st, 1852, finding again some difficulty in passing the No. 2 bougie, and considering that the treatment of the case by dilatation would, at all events, be very tedious, even if otherwise satisfactory, I applied the potassa fusa. January 3rd.—Has passed his urine rather better; applied potassa fusa. January 5th.—No irritation; applied potassa fusa on a No. 4 bougie, which soon passed through the stricture, but was stopped

by another obstruction at 6½ inches, to which I also applied the caustic. January 7th.—The stream of urine has improved, and the irritability of the bladder is diminished. Examined the urethra with a No. 4 bougie, which readily passed through the first stricture, and entered the second nearly a quarter of an inch; applied potassa fusa to the latter obstruction. January 9th.—Improving; applied potassa fusa to the last stricture. The patient was obliged to leave town for a fortnight, when the stream of urine appeared of a good size, and I had little difficulty in the introduction of a No. 6 silver sound. There was no further occasion for the application of potassa fusa, as the strictures gradually yielded to the introduction of a full-sized sound, which the patient occasionally passed for himself. The last time I saw him, he passed his urine in a full, free stream. No irritation beyond a gleety discharge, occasionally of a brownish colour, occurred during the treatment.

Case 33.—*Irritable Stricture, with Retention of Urine.*

Mr. M., aged 52, residing at Islington, came to me at nine o'clock on the morning of August 23rd, 1852, having been unable to pass any urine since the previous evening. Had long been a great sufferer from stricture, for the relief of which he had been for several years in the habit of occasionally introducing for himself a small bougie. Attributes his present attack of retention to having taken a glass of brandy and water. He had not for a long time previously ventured to take any spirits. I endeavoured to introduce a No. 2 elastic catheter, first without, and afterwards with, its stilet, but unsuccessfully, as they only just entered a stricture at 5¼ inches. A small silver catheter was tried with no better effect, as were also plaster bougies, the smallest size of which did not go further than a little beyond the entrance of the contraction. A No. 2 catgut bougie was then introduced and left in the stricture for quarter of an hour, but when withdrawn no urine followed, although the spasmodic contractions of the bladder were very urgent. All these attempts having failed, a small piece of potassa fusa was inserted in the end of a No. 3 bougie, passed down to the obstruction, and kept gently pressing against it for about a minute, when I could feel the spasm yielding, and the instrument soon went through the stricture, which appeared to be three-quarters of an inch long. Having allowed the bougie to remain a sufficient time for the potash to dissolve, it was withdrawn, and the urine immediately followed in a small stream, the patient completely emptying his bladder. The retention in this case would, no doubt, have gradually yielded to the influence of opium and the warm bath; but, in all probability, the application of the caustic potash, by its powerful antispasmodic effects, saved the patient from many hours both of mental and bodily suffering.

Case 34.—*Impermeable Stricture.*

Mr. L., aged 45, first consulted me April 5th, 1852. Has long had difficulty of micturition, which has latterly greatly increased. His urine is at present passed either by drops or in a very fine stream, with much straining.

Is obliged to rise several times in the night from an urgent desire to pass his water. Has had bougies frequently introduced, but none have been got through the stricture, and all attempts of the kind have caused more or less bleeding. On examination, I found a stricture at 6½ inches, through which I could not pass the smallest sized bougie, or any kind of instrument. As the urine was highly acid, alkalies were prescribed, and an opiate at bedtime. As the stricture was extremely sensitive, and disposed to bleed on slight pressure, on my patient's next visit I applied the potassa fusa. April 10th.—Tried to pass a No. 1 bougie, the point of which just entered the stricture: afterwards applied the potash. 13th.—The urine has been passed better since the last application. Applied potassa fusa on a No. 2 bougie, which entered a quarter of an inch into the stricture. After three more applications of the potash I was enabled to pass a No. 4 silver catheter into the bladder. As the stricture was long, hard, and unyielding, it required several more applications of the caustic to enable me to effect satisfactory dilatation. I have since seen this gentleman occasionally, and have easily succeeded in passing for him a No. 8 bougie. As he finds no difficulty in micturition, or any other unpleasant symptom, I cannot persuade him to permit me to effect any further dilatation.

Case 35.—*Irritable Stricture.*

Mr. A., aged 27, applied to me June 10th, 1852. Is rather a free liver, and has suffered much during the last five years from stricture. Has had several attacks of retention of urine, which have been relieved by opiates and the warm bath. The urine is passed with great difficulty and very painful straining. No instrument has been passed into the bladder, although frequent attempts to effect that object have been made. I could just get the point of a No. 1 bougie into a stricture at 6¼ inches from the meatus. As the obstruction was highly sensitive, I at once applied the potassa fusa. 12th.—Passed with some little difficulty a No. 1 bougie into the bladder; but not being able to replace it by a No. 2, which was very firmly grasped, I applied the potash. With the assistance of an occasional application of potassa fusa, I had produced sufficient dilatation to enable me, on the 3rd of August, to pass a No. 6 bougie. This gentleman came to me occasionally afterwards, whenever he found the stream of urine getting smaller, to have a bougie introduced. He was always relieved for some length of time by the introduction of the bougie, and finding but little inconvenience from his complaint, I could not persuade him to have his stricture fully dilated.

Case 36.—*Irritable Impermeable Stricture.*

Mr. M., aged 67, consulted me June 14th, 1852. Has been, for several years, a great sufferer from stricture. His urine is voided with great difficulty, and painful straining. His disease, he says, is hereditary. He is the eldest of five brothers, all of whom had bougies passed before they were fifteen years of age: he himself had a bougie introduced when eleven years old. His father was also a great sufferer from urethral stricture. Simple dilatation having been tried unsuccessfully by two eminent surgeons, the

irritability of his stricture resisting all attempts to introduce dilating instruments, he came to me to try the effect of the treatment by potassa fusa. On examination, I found a No. 1 bougie stopped at $5\frac{1}{4}$ inches by an obstruction, to which I applied the caustic. He was taking alkalies and antispasmodics, which were continued. 16th.—Applied potassa fusa on a No. 2 bougie, the point of which entered a quarter of an inch into the stricture. 18th.—Much relieved; his urine, which for some length of time had been voided principally by drops, now passes in a small continuous stream. 28th.—The potassa fusa has been applied three times since the 18th. To-day a No. 3 bougie passed through the stricture, but was stopped by a second obstruction at $6\frac{1}{2}$ inches, to which I applied the potash. 30th.—Great improvement in the stream of urine. Applied potassa fusa on a No. 4 bougie, which went through the second stricture. August 23rd.—I had seen nothing of this gentleman since the 30th of June, as he had been passing bougies for himself, having got as far as a No. 7. He is now suffering from retention of urine, having passed none since last night. Not succeeding in getting the smallest sized instrument of any kind through the second obstruction, I applied the potassa fusa to it, and after a very little gentle pressure, the bougie, a No. 3, went through the stricture. After withdrawing the bougie, sixteen ounces of urine were passed in a tolerable stream. This gentleman did not again require the application of the potash, his strictures readily yielding to simple dilatation.

Case 37.

Mr. M., aged 38, applied to me August 31st, 1852. Has had more or less difficulty in micturition for several years. Attributes his complaint to a protracted gonorrhœa, which occurred nine years ago. Every attempt to pass an instrument during the last three years has been unsuccessful. Has latterly suffered much from irritability of bladder. On examination, I found an obstruction at $5\frac{1}{4}$ inches, through which a No. 1 bougie passed, but was stopped by a second, at $6\frac{1}{4}$, into which I could not get the smallest instrument of any kind. After six applications of potassa fusa to both strictures, they readily yielded, and at the end of six weeks I could pass a No. 12 sound.

Case 38.—*Impermeable Stricture.*

J. C. F., Esq., about 47 years of age, first consulted me, September 28th, 1853. Has had some difficulty in voiding his urine from the age of twenty-one. Instruments have been passed for him at various times, with more or less benefit. For the last few years his sufferings have gradually increased, and the introduction of instruments has generally caused so much irritation, that but little relief has been afforded by them, it being seldom possible to pass any but very small ones. For some length of time before his application to me, it had been found impossible to pass an instrument of any kind through the stricture, although attempts to do so had been made by skilful surgeons; very free bleeding had followed some of these attempts.

The difficulty of micturition has latterly much increased, only a few teaspoonfuls of urine having been voided by drops, after prolonged and painful straining, attended with considerable prolapsus ani. Occasionally, attacks of complete retention of urine have occurred. For a long time this gentleman's life has been so miserable from the severity of his sufferings, that he is willing to undergo any operation likely to afford him a chance of relief. He was informed that division of his stricture by perineal section was the only means likely to improve his condition. Before submitting to that operation, he consulted me as to the probability of the application of the caustic potash being likely to prevent the necessity of so severe a measure. At the time of his application, Mr. F. was constantly disturbed, both night and day, by an urgent desire to pass his urine, which could be voided only by drops, and in a very small quantity at a time. On examination I found an obstruction at 5¼ inches, into which the point of a small bougie just entered, but no instrument of any kind could be passed through the stricture. It required seventeen applications of potassa fusa before a No. 3 bougie could be passed through the stricture into the bladder. The irritability of the bladder had been gradually subsiding after the fourth application of the potash, and had entirely ceased by the time the bougie went into the bladder. On attempting, shortly afterwards, to pass a larger bougie, it was stopped by a second stricture at 6½ inches, which proved of such gristly hardness, and so extensive, that it required fifteen applications of the caustic before the obstruction yielded sufficiently to permit the introduction of a No. 7 steel sound into the bladder. It may be as well to state, that, from its greater hardness, the second stricture required a much freer application of the potassa fusa than the first. My patient left town on November 19th, at which time I could pass a full-sized sound. He then voided his urine in a full stream, and was perfectly restored to health. During the whole of the treatment he came to my house to have the potassa fusa applied, never having been confined to his room for a single day. Although, as has been stated, it was necessary to apply the caustic very freely to the second obstruction before it yielded, the patient declared that he had suffered much more from a single attempt to force an instrument through his stricture, than from the whole of the applications of potassa fusa. I have frequently heard from this gentleman since. He continues to pass his urine in a full stream, but adopts the precaution of passing for himself occasionally a full-sized sound.

Case 39.—*Irritable Stricture.*

Colonel R., aged 65, has been troubled with strictures for nearly forty years, and has for a long time been a great sufferer. Has had frequent attacks of retention of urine. Many attempts, during the last ten years, have been made to dilate his strictures, but no instrument larger than a No. 3 could ever be passed, and that size always caused a high degree of urethral irritation, and severe rigors. So great is the irritability of the bladder, that it will seldom retain more than an ounce of urine. The

irritability does not arise from over-distension, as a small elastic-gum catheter has frequently been passed immediately after micturition, to ascertain if any urine remained in the bladder. From the frequent desire to micturate, seldom more than an hour's undisturbed sleep is obtained during the night. Finding scarcely any relief from ordinary treatment, Colonel R. applied to me May 5th, 1854. On examination I was able to pass a No. 2 bougie through two strictures, one at $5\frac{1}{4}$, the other, at $6\frac{1}{2}$ inches. After withdrawing the bougie, which was strongly grasped, I applied the potassa fusa to both obstructions. As the urine was too acid, alkaline remedies and opiates were prescribed. The application of the potash very remarkably diminished the irritability of the strictures and bladder; no rigors having occurred since the second application. After using the caustic eight times, I could pass a No. 4 bougie into the bladder, and the patient was able to retain his urine for three hours at a time, which he had not done for several years. At this time Colonel R. was obliged to go into the country. On his return to London, a few months afterwards, he complained much of the irritability of his bladder, the frequent desire to micturate having again become troublesome, although he passed for himself occasionally a No. 4 elastic-gum catheter; but no rigors had occurred since the use of the potash. Thinking that the vesical irritability was principally sympathetic, and caused by the irritation of the urine passing over the inflamed urethral membrane at the seat of the disease, I fixed a No. 4 elastic catheter in the bladder, which was retained for twenty-four hours, when a larger size was easily introduced. At the end of three weeks I could pass with facility a No. 12, when the Colonel returned to the country. By adopting the precaution of occasionally passing the catheter, I was informed that he had no further need of surgical assistance. The treatment by retention of the catheter had been tried several times before the application of the potassa fusa; but from the great irritability of the strictures no satisfactory dilatation could be obtained.

Case 40.—*Irritable Stricture.*

E. P. O., Esq., aged 65, applied to me April 10th, 1855. Has had some difficulty in micturition for several years, which has latterly much increased, and there is now a little dribbling during the night. His water for some months has been passed in a very small stream, with straining. Has a slight gleety discharge. On examination with a No. 2 bougie, it stopped at five inches, but after a little pressure went forward to a second obstruction an inch and a quarter further on, through which I could not pass it. Three days afterwards I passed a No. 1 bougie into the bladder; and in a few days succeeded in the introduction of a No. 3, after which the second stricture became so irritable as to prevent my passing the smallest bougie. I then applied the potassa fusa to both strictures; and, after a few applications, they readily yielded to dilatation, so that by the end of two months a No. 9 bougie was passed into the bladder without difficulty. At this time the patient left for the country, when micturition was better

than it had been for years. He promised to pass the bougie occasionally.

I had not seen Mr. O. since June, 1855, until he came to my house at 10 A.M., July 31st, 1858, having had complete retention of urine since the previous evening. I was informed by Mr. O. that he had remained perfectly well from the time he was under my care until within the last few months, when, finding some little difficulty of micturition, he again had recourse to the bougie, the use of which he had, however, long discontinued, considering its introduction unnecessary. He used the same sized bougie which he had been in the habit of passing, but does not think he ever succeeded in getting it into the bladder as before. There was always a little pain, and some bleeding, after each operation. He had been unable to void any urine since his attempt to pass a bougie on the preceding evening. I passed a No. 1 bougie into the bladder, and allowed it to remain for a few minutes. As no urine followed the withdrawal of the bougie, I introduced with some little difficulty a No. 2. When the instrument was withdrawn, urine to the amount of 16 ounces immediately followed in a small stream. The urethra appeared to be in a state of inflammation, from the commencement of the stricture to the neck of the bladder, judging from the degree of pain felt all along that part on the gentle introduction of the bougie. Finding, although in a few days I could pass either a No. 4 bougie or the same sized sound, that but little relief was obtained, in consequence of the persistence of the inflammation and spasm, I had recourse to the application of potassa fusa, by arming a No. 4 bougie with the caustic, and passing it gently along the urethra from the stricture to the neck of the bladder. From the commencement of this treatment the improvement was very marked. Before the use of the potash, each introduction of an instrument was followed by a slight oozing of blood; but after the second application there had been no bleeding, and by the end of August I was able to pass a No. 9 bougie. Mr. O. then returned to the country, having promised me not to again neglect the regular use of the bougie.

Mr. O. called upon me on the 3rd of October, 1859, and informed me that he micturated in a full stream without the slightest difficulty. He passes for himself a full-sized bougie once a week.

CASE 41.—*Impermeable Stricture.*

Captain L., aged 47, consulted me April 16th, 1855. Has suffered much from stricture for more than twenty years. His urine has for a long time been voided with difficulty, either by drops, or in a minute stream. Has some dribbling during the night. On examination with a No. 1 bougie, I met with an obstruction at 5 inches, through which the instrument passed to a second, at 6½. As this gentleman had been for some time under the care of an eminent surgeon, who had not succeeded in getting any instrument into the bladder, I applied potassa fusa to the first stricture. Captain L. informed me that he had never derived much benefit from simple dilatation, in consequence of the great irritation which was always caused by the introduction of instruments. After three applications of the potash to the first stricture, a No. 3

bougie passed through it to a second, to which I applied the caustic. After four applications to the second obstruction, the No. 3 bougie went into the bladder. With the assistance of an occasional application of potassa fusa, I was enabled to pass with facility a No. 8 bougie. Captain L. then left for the country, and promised me to continue, for some length of time, the regular use of the bougie. This gentleman declared that he had derived more benefit from the treatment by potassa fusa than he had during nine years from the ordinary method.

Case 42.—*Impermeable Stricture.*

Mr. S., aged 40, consulted me January 4th, 1856. Has long suffered greatly from stricture, which he attributes to a gonorrhœa contracted twenty-two years ago. Has a gleety discharge, and difficult micturition, attended with very painful straining efforts. His urine has, for several months, been passed chiefly by drops, and his rest is much disturbed by frequent and urgent desire to micturate. No instrument, he tells me, has for several years been passed through a stricture at 4½ inches. The last surgeon whom he consulted, after many persevering efforts to get an instrument through the stricture, assured him that perineal section was his only chance of relief. On examination I found an obstruction at 4½ inches, into which the point of the smallest bougie just entered. When withdrawn there was a little blood on the point of the bougie. January 6th.—Not being able to get the small bougie further into the stricture, I applied the potassa fusa. 8th.—Has passed his urine with less pain and straining than for many months previously. 10th.—Passed a No. 1 bougie into the bladder; but not being able immediately afterwards to introduce a No. 2, I applied the potash. 16th.—Much improved, his urine being now voided in a continuous stream without straining. Passed a No. 2 bougie into the bladder, and afterwards used the caustic. 19th.—Passed into the bladder a No. 3 bougie, which was retained for a quarter of an hour. It was very firmly grasped when withdrawn. 21st.—Had only to pass his water but once last night. Introduced a No. 3 bougie into the bladder, and afterwards applied potassa fusa. No more applications of caustic were required, the use of the bougie alone enabling me to complete the dilatation satisfactorily.

Case 43.—*Impermeable Stricture, with Fistulous Openings.*

Mr. G., aged 47, consulted me, January 26th, 1856. Has been, during many years, a very great sufferer from stricture, which he attributes to a gonorrhœa contracted when nineteen years of age. Has had perineal abscesses at different times, which have left some fistulous openings. Has been under the care of very able surgeons in different hospitals. Two false passages have been made, commencing at 6¼ inches from the external meatus, and passing for some little distance between the bladder and rectum. The fistulæ have been laid open without any good result. The patient says that great force has frequently been used in attempts to pass instruments,

and that they always caused more or less bleeding; the hæmorrhage being at one time so great as to cause considerable exhaustion. Has at present three fistulous openings, one at the back part, another at the side, of the scrotum; and one between the bladder and rectum, by which often the greater part of the urine passes. On examination with a No. 2 bougie, I found it stopped at 2½ inches' distance, by a stricture, by which I afterwards passed a No. 2 sound as far as 6¼ inches, where there was another obstruction: on making very gentle pressure, the instrument went forward with a jerk into a false passage, as was evident on introducing my finger into the rectum. January 27th.—Applied potassa fusa to the second obstruction with my curved metallic conductor. 29th.—Applied the caustic to both strictures. February 3rd.—Says he passes his urine better than for some months previously. Passed a No. 5 bougie to the second stricture, and afterwards used the potash. 6th.—A No. 5 bougie entered the second obstruction, and was firmly grasped. After it was withdrawn, the potassa fusa was applied. March 15th.—The caustic has been used once a week since the 6th of February, with marked improvement; and to-day I introduced a No. 6 silver catheter into the bladder, and drew off a little urine. A No. 7 was afterwards easily introduced. No urine passes by the scrotal fistulæ, but some still by the rectum, although frequently nearly the whole is voided naturally. The patient being now able to pass bougies for himself, returned to his usual avocations.

I had not seen Mr. G. since the 15th of March, 1856, until October 15th, 1859, when he came to me to have the potassa fusa applied again, as his urine had not been passed quite so freely during the last month, which he attributed to a severe illness. His general health had been excellent until that time, and micturition performed with comfort, a little urine occasionally passing by the fistulous opening in the rectum. The patient had passed bougies for himself at different times. I introduced a No. 4 bougie into the bladder with ease, and afterwards applied the potassa fusa, from which he had previously derived so much benefit.

Case 44.—*Irritable Stricture.*

Mr. R., aged 40, residing in the country, consulted me September 22nd, 1856. Has long suffered from difficult micturition, with some gleety discharge. No instrument has been passed into the bladder. After several attempts I got a No. 1 bougie through a very irritable stricture, at 6½ inches' distance. October 18.—Finding that I could make no satisfactory progress by simple dilatation, I applied potassa fusa. After three applications of the caustic, I was enabled to pass a No. 5 bougie into the bladder. The stricture then gradually yielded to ordinary dilatation, so that by the end of November, I could pass a No. 12 sound with facility, and shortly afterwards a No. 14. This patient has since been to me occasionally, at distant intervals, but the tendency to recontraction is so slight that the full-sized sound is easily passed.

Case 45.—*Irritable Stricture.*

Mr. W., chemist, aged 45, consulted me December 16th, 1856. Has long been troubled with an irritable stricture. Understanding from this gentleman that he had derived no advantage from ordinary treatment, owing to the extreme irritability of his stricture, I determined at once to adopt the treatment by potassa fusa. On examination with a No. 4 bougie, it passed through a stricture at five inches' distance, and was stopped by a second at six, which was very painful on gentle pressure. The caustic was applied to both obstructions. After four applications of potassa fusa, I was able to introduce a No. 6 bougie into the bladder. Within a month's time after the commencement of the treatment, a No. 10 bougie could be passed with ease. This gentleman being obliged to leave for China, was desired to pass bougies occasionally.

Case 46.—*Irritable Stricture.*

W. ——, Esq., a surgeon, in the East India Company's service, consulted me December 22nd, 1856. Has long suffered from an irritable stricture, which always proved refractory to dilatation, the introduction of any kind of instrument beyond a No. 3 invariably causing so much irritation as to prevent any further progress. For some time past he has seldom been able to void his urine without having recourse to the introduction of a No. 2 elastic catheter. As dilatation had completely failed in the best hands, I determined to use the potassa fusa at once; indeed, he came to me for that purpose. On examination with a No. 2 bougie, it passed, with slight pressure, through a rather long stricture at five inches' distance, to which I at once applied the caustic. The potassa fusa was applied on the 24th and 26th on a No. 3 bougie, which can now be passed through the strictures. 28th.—Considers himself much improved. Has not been obliged to use the catheter for the last two days. Says he has never had so little pain in the introduction of instruments as at present. January 1st.—Has been able to retain his urine for seven hours. A No. 5 bougie was passed through the stricture at five inches, but was stopped by a second an inch beyond the first, to which I applied the potash. This second obstruction was half an inch long; and after a few applications of the caustic, I was enabled to introduce a No. 7 bougie into the bladder without its causing any irritation. This gentleman then went into the country, but promised to use the bougie regularly. I saw him about two months afterwards, when he expressed himself as being very grateful for the benefit he had derived from the potassa fusa, which had entirely relieved him from a state of great bodily, as well as mental suffering. If the potassa fusa had failed, he had determined to resort to perineal section.

Case 47.—*Irritable Stricture.*

Colonel C., aged 47, just returned from India, consulted me July 19th, 1857. Has suffered from difficult micturition, with occasional gleety dis-

charge, for the last twenty years. The irritability of the bladder, which had been more or less troublesome for several years, has latterly become so distressing as to leave him but little time for rest, from the frequent urgent desire to micturate. Colonel C. said it was useless my attempting to treat his disease by ordinary dilatation, as "it had been tried over and over again without any permanent benefit." On examination with a small bougie, it was stopped at five inches' distance by a very sensitive stricture, which the point of the instrument just entered. After having withdrawn the bougie, I directly applied the potassa fusa. The urine being too acid, alkalies were prescribed. After six applications of the potash, I could pass a No. 5 bougie into the bladder. The irritability of the bladder then greatly subsided. So much relief was afforded by the use of the potassa fusa, that it was continued until I was enabled to pass easily into the bladder a No. 10 bougie, when the Colonel left town for the country; but promised me to continue the regular introduction of the bougie.

Case 48.—*Irritable Stricture.*

C. ——, Esq., aged 28. Has been troubled for several years with symptoms of urethral stricture; and latterly, his sufferings have much increased. Attributes his disease to a gonorrhœa contracted seven years ago; says that for many months afterwards he was annoyed by a gleety discharge. Had complete retention of urine two years ago, which was relieved by full doses of opium. The stream of urine is at present thread-like, and is spurted out in small quantities. The bladder is excessively irritable; some dribbling of urine occurs during the night. This gentleman is of a full, plethoric habit, a fine illustration of the sanguine temperament. He had tried the effect of dilatation, in skilful hands, without deriving any benefit from it. So excessively painful had been the attempts to pass instruments, that he had the greatest dread of the introduction of any kind of instrument. After several very gentle trials, I passed a No. 1 soft bougie through two strictures one, at $5\frac{1}{2}$, the other at $6\frac{1}{2}$ inches' distance from the external meatus. The strictures were so exquisitely sensitive, and the general nervous excitement so great, as to cause the patient to scream with pain when the bougie went through the strictures, which he said was "like the passing of a hot iron." Finding, after three more attempts at dilatation, that even the introduction of a No. 2 soft bougie could scarcely be borne, or retained beyond two or three minutes, and that when withdrawn there was a little oozing of blood, I applied the potassa fusa to the second stricture, which appeared to be the principal cause of the difficulty in the introduction of instruments. Two applications of the potash enabled me to pass a No. 3 bougie into the bladder, with but very little pain to the patient. The stream of urine had improved since the second application of the caustic. After twelve applications of potassa fusa, all urethral irritability and inflammation had subsided, and I could pass a No. 8 bougie with facility. Mr. C., considering he was now well enough to take care of himself, discontinued his attendance, being, however, impressed with the necessity of continuing, for some length of time, the use of the bougie, so as to produce full dilatation of the strictures.

CHAPTER IX.

ON THE OPERATIONS FOR THE RELIEF OF RETENTION OF URINE, AND FOR THE DIVISION OF STRICTURES.

PUNCTURE OF THE BLADDER—OPENING THE URETHRA.

THE operations occasionally performed for retention of urine, and for division of strictures, are none of them entirely free from danger. Each has its peculiar hazards. In some cases of intractable stricture the performance of one of them may, however, offer the best, if not the only, chance of affording relief. It becomes then a subject of deep interest to the surgeon, as also to his patient, to consider well what are the circumstances in which these operations may be required; and when necessary, which of them should be selected as the most advantageous.

Continued retention of urine may place life in such peril, that one of these operations may be the only chance for its preservation. Under long suffering from a stricture impervious to instruments, the general health may gradually fail, and the bladder become so irritable as to render exceedingly hazardous any further delay in procuring a free passage for the urine. These are not, however, the only circumstances in which an operation may be required. It may so happen that a stricture has long been impassable to instruments; and although there may be no retention of urine, whilst the powers of the constitution remain but little impaired, yet an operation will be equally necessary as in the instances previously mentioned. It is true that such necessity may not be so apparent to the patient, but to the surgeon, with whom "coming events cast their shadows before," the necessity is urgently evident. He foresees the mischief, which sooner or later must occur behind the obstruction. He knows that at any time an ulcerative breach may be made in the urethra; or that the canal may be forcibly burst by the powerful action of an hypertrophied bladder, when all the resources of surgical art may prove powerless in rescuing the sufferer from destruction.

If, after the failure of other and less severe means of overcoming the obstruction, continued retention of urine, a breaking up of the general health, or impending extravasation of urine, should render an operation necessary, it will then be the duty of the surgeon to adopt that one which, under the peculiar circumstances, will be attended with least hazard and likely to afford the most permanent benefit to his patient.

PUNCTURE OF THE BLADDER.

This was formerly the operation commonly performed for the relief of a patient suffering from retention of urine, and is at present that which appears to be most generally practised. There are three ways by which the bladder may be punctured:—By the perineum. Through the rectum. Above the pubes. The first method has but few advocates, being severe and also more hazardous than the others, from its greater liability to be followed by infiltration of urine into the cellular tissue.

Puncture through the Rectum.—This is an operation very easily performed; and in retention from stricture, unattended with enlargement of the prostate, is probably the method that will be found most advisable in the majority of cases. In the hands of Sir Everard Home, who performed it on several occasions, the operation proved remarkably successful. The mode of proceeding is very simple. As good a position as any for the operation is obtained by having the patient's nates brought forward, so as to project a little over the edge of the bed, with his thighs supported by assistants in a similar position to that for lithotomy. The rectum having been well emptied by an enema, a short time before commencing the operation, the surgeon, introducing his left index finger, well oiled, into the rectum, passes its tip just beyond the posterior boundary of the prostate gland, and keeps it there fixed as a guide for the passage of the proper curved canulated trocar, which is then passed along the finger, and the point of the instrument so directed, through the coats of the rectum and bladder, that the vesical puncture is made in the lower part of the triangular space to avoid the chance of any escape of urine into the peritoneal cavity. The trocar having been withdrawn, the canula should be securely fixed in the bladder by a T bandage, and retained until the stricture has yielded to the introduction of an instrument sufficient to permit the passage of the urine by its natural channel.

The necessity for keeping the canula in the bladder is evident,

for it has occasionally happened that when the tube has either accidentally escaped, or been intentionally withdrawn, the surgeon has been compelled to resort to re-puncture, in consequence of a return of the retention.

This operation has proved fatal from urinary infiltration causing gangrenous inflammation of the cellular tissue between the bladder and rectum; also, from the escape of urine into the peritoneal cavity, of the occurrence of which, however, there is not much probability when the operation has been properly performed. The wound made in the operation has occasionally remained fistulous during life. An abscess has sometimes formed between the bladder and rectum, after the recto-vesical puncture; and the vesiculæ seminales have, in some instances, been wounded, proving that, however simple the operation may be considered, it is one which should neither lightly nor carelessly be performed.

Mr. Cock, of Guy's Hospital, who has probably performed this operation oftener than any other surgeon in London, considers that in cases of retention of urine the bladder may be reached with the least risk of present, or future, danger, and with the greatest prospect of ulterior good, by puncture through the rectum. Mr. Cock has performed this operation occasionally in cases of impermeable stricture, in which, although attended with great difficulty of micturition, there was no immediate necessity for its performance for the relief of retention. Mr. Cock believes the operation in such cases to be justifiable, from the advantage subsequently gained by the stricture yielding to dilatation. In the *Lancet* of January 31, 1852, Mr. Cock has related three cases of puncture by the rectum, in which, after the urine had passed for a few days through the new channel, the urethra remaining completely at rest, the strictures yielded to dilatation. Although fully agreeing with Mr. Cock that this operation, when admissible, is preferable, in cases of retention of urine, to that of perineal section, forced catheterism, or even opening the urethra, except under peculiarly favourable circumstances, I should never perform it, or recommend its performance, except in cases of immediate danger, feeling, as I do, confident that the potassa fusa, when properly used, will, with rare exceptions, enable the surgeon to accomplish dilatation under such circumstances without the slightest risk to the patient.

Mr. Cock has had constructed by Mr. Biggs, of St. Thomas's-street, a double canula, with cranks so fixed to the upper part of

the outer one, that the instrument cannot slip out of the bladder and rectum.

Sir B. Brodie, in his remarks on the different operations required for retention of urine resulting from stricture, observes:—"On the whole, from what experience I have had on the subject, I am inclined to believe that the puncture of the bladder from the rectum is applicable to a greater number of cases than any other operation." It would be injustice to my readers were I to omit the concluding observations upon this subject by the same eminent surgeon, and which cannot be too extensively known; they are, indeed, highly significant in these times, when there are so many aspirants eager for distinction in the alluring department of operative surgery. The observations alluded to are the following:—"After all, however necessary it may be to the safety of the patient in some instances, it is an operation that is very rarely required. Surgeons who see a great number of cases of retention of urine, may, in the course of their lives, be called upon to perform it in a *few* instances. Those who perform it frequently, must often perform it unnecessarily; at least, this is what I am bound to say, judging from my own experience."

Puncture above the Pubes.—This was a favourite operation of the late Mr. Abernethy, who preferred it to the recto-vesical method. His mode of performing it appears to me to be the best and the safest. Having made an incision through the integuments extending two inches upwards from the symphisis pubis, he then separates the pyramidal muscles, and feeling with his finger the distended bladder, he easily made the perforation with the canulated trocar, directing its point towards the os cocygis. The trocar having been removed, an elastic-gum catheter was introduced through the canula, and the latter was withdrawn. The end of the catheter projecting from the wound was bent downwards towards the pubes, and fixed steadily by attaching it to a circular bandage placed round the patient's body. The tube left in the bladder must be plugged, and the plug removed when the bladder requires to be emptied.

Sir B. Brodie observes with regard to this method:—"If the patient be thin, and the bladder be much distended, you may puncture it above the pubes: but if the patient be corpulent, this operation will be difficult; and if the bladder be contracted, it will be impracticable."

Infiltration of urine, and a sloughy state of the wound, have

occasionally proved fatal after this operation. The best means of preventing infiltration will be a free external incision, and the maintenance of a dependent opening for the egress of urine. I have performed this operation but once, and the case is related in this work. In that instance a free incision, 2½ inches long, was made, and no untoward circumstance occurred. In cases where puncture of the bladder is deemed requisite, I believe, as a general rule, the operation by the rectum will be the one most judicious, when retention is caused by strictures; and that above the pubes, when it arises from an enlarged prostate. The puncture of the bladder having relieved the stricture from the forcible pressure of the urine, that fluid will probably soon flow in part by its natural passage, and the obstruction will then generally yield to dilatation; but if not, I believe the application of potassa fusa will seldom fail in effecting our object. In some cases, where puncture of the bladder has been performed for retention from enlarged prostate, it has been found necessary to retain a tube in the wound during the patient's lifetime.

Dr. Wilmot informs us, in his work on "Stricture of the Urethra," that the operation above the pubes has for a long time been practised by the Dublin surgeons, in preference to that by the rectum. Dr. Wilmot recommends, instead of removing the canula immediately after having introduced through it the elastic-gum catheter, that the former should be allowed "to remain in for twenty-four or thirty-six hours, at the end of which time the adhesive process will have obliterated the areolar tissue about the incision, and there is no fear of any urine which may escape along the sides of the catheter being infiltrated."*

Dr. Gross, in his "Treatise on the Diseases of the Urinary Organs," quotes the following interesting statistics of ninety-two cases of puncture of the bladder:—

Puncture.	No. Cases.	Success.	Fistula.	Infiltration.	Abscess.	Hæmorrhage.	Death.
Perineal .	9	6	1	0	0	1	1
Recto-vesical	28	19	3	3	1	0	2
Supra-pubic .	55	49	0	0	0	0	6
Total .	92	74	4	3	1	1	9

That the operation of puncture of the bladder will very seldom be necessary, must be evident from the rarity of its performance

* On Stricture of the Urethra. By S. G. Wilmot, M.D. 1858.

by surgeons who have acquired great eminence in the department of urethral surgery.

In the second edition of his work on "Stricture of the Urethra, and Fistula in Perineo," Professor Syme observes, when alluding to puncture of the bladder:—"During more than twenty years' practice in the Royal Infirmary of Edinburgh, I have, as also in private practice, never found it necessary."

Civiale states that he has only been obliged to puncture the bladder in two instances.

Leroy d'Etiolles observes:—"For twenty years I have very often, as may be readily believed, been called to cases of retention of urine, and have never, in a single instance, been obliged to have recourse to the puncture of the bladder."

OPENING THE URETHRA.

This is, sometimes, a very simple proceeding, unattended with danger, and may be successfully adopted for the relief of a distended bladder from stricture. The simplicity and freedom from danger of the proceeding, however, are only applicable to the few cases requiring operation, in which the tissues in the neighbourhood of the obstruction are but little altered from their normal structure. In such cases the membranous portion of the urethra behind the stricture is usually, more or less, dilated whenever the patient strains to empty his bladder; and should the obstruction be no further back than the commencement of the bulb, the operation will be easily accomplished.

To the practical genius of Sir Astley Cooper the profession is indebted for having originated this safe and easy means of relief for a distended bladder, the result of urethral obstruction; an operation equally happy in its conception as in its success. In the first case of this kind operated upon by Sir Astley, in 1793, an incision through the common integuments at once exposed the dilated urethra, which was readily opened with a lancet, and the patient at once relieved from intense suffering by a proceeding scarcely more formidable than the opening of a common abscess. How vividly does imagination picture the admiration of the spectators of this novel and beautiful operation, as remarkable for its simplicity as the facility of its execution! It will be recollected that puncture of the bladder was the usual operation previously performed on such occasions. Enviable, indeed, must have been the

feelings of the surgeon who had just achieved such a triumph in his art.

Would, indeed, that matters were always so simple in retention from urethral stricture! How many an anxious hour would then be spared both patient and surgeon! It must be admitted, however, that in cases of retention from stricture requiring operation, it usually happens that there is more or less gristly induration at the immediate seat of disease, very probably complicated with thickening of the perineal tissues from former abscesses, and perhaps one or more sinuses. In such a state, with an impermeable obstruction, the operation of opening the urethra, and subsequent introduction of a catheter, becomes a far more serious proceeding. There can be no question, I imagine, when an operation is required for the relief of a distended bladder resulting from stricture—provided the tissues concerned in the operation, with the exception of the urethral dilatation, be but little altered from their normal state, and the patient has not a deep perineum—that Sir A. Cooper's method of relief is the best. The directions given by Sir Astley are, that a staff is to be passed as far as the stricture, and its point turned downwards; an incision must then be made upon, and beyond it, when, during the straining efforts of the patient to void his urine, the dilated portion of the urethra, being felt by the finger, should be opened with a lancet. In cases favourable for this operation, the patient during the contractions of his bladder is usually conscious of the distension of the dilated portion of the urethra, which can also frequently be felt distinctly through the rectum by the finger of the surgeon.

The operation of opening the membranous portion of the urethra, in aggravated cases of urethral stricture, was much practised by the late Mr. Guthrie. This is a favourite operation of Mr. Simon's in cases of retention of urine from impermeable stricture.

CHAPTER X.

INTERNAL DIVISION OF STRICTURES—DIVISION BY THE LANCETTED CATHETER—EXCISION OF STRICTURES.

In the more intractable forms of urethral stricture in which the ordinary method of dilatation has failed, their division by the knife has, in many cases, been adopted with more or less successful results. There are two modes of effecting this object:—From within, by the lancetted catheter, or other cutting instrument, passed along the urethral canal; and from without, by perineal incision. Each of these operations has its supporters. The former method had often been tried, but had quite fallen into disuse until it was revived by the late Mr. Stafford, who very strongly advocated the division of strictures from within, by an instrument well known as the lancetted catheter. Should the obstruction be in the straight part of the urethra, within the first five or six inches of the external orifice, it may probably be divided by the lancetted catheter, without much risk, as the direction of the instrument can be ascertained with tolerable accuracy by the finger. When a stricture is in the curved portion of the urethra, this method, although it appears to have been frequently successful in the hands of Mr. Stafford and others, must, surely, be somewhat hazardous; for where there is much condensation at the seat of disease, the most expert operator can scarcely be certain of cutting in the right direction.

In an irregular hard stricture, at a distance, where the finger cannot possibly distinguish if the lancetted catheter be in the direct line of the urethra, the instrument may do much mischief even when used by the ablest surgeon, for it must be by a fortunate chance should the incisions be made in the proper course. I know that many successful cases have occurred, in

which the bladder has been safely reached by this method; but I know, also, that extremely untoward events have happened from the use of the lancetted catheter. In some instances, the instrument has taken a wrong course. Hæmorrhage of an alarming character has sometimes ensued; and, occasionally, extravasation of urine. In one case, which came to my knowledge, the seminal ducts were divided, and the patient rendered impotent for life. This operation has even been fatal. When cutting with this instrument through a hard and intricate passage to the bladder, we shall be somewhat in the position of the seaman without chart and compass, for, like him, although we may chance to proceed in the right direction, we shall be just as likely, if not more so, to take a wrong course. It is but proper to state, however, that Mr. Guthrie successfully employed the lancetted catheter in some cases where the stricture was in the curved portion of the urethra, and in a manner that is certainly attended with less risk than the method usually adopted. This surgeon, with a No. 6 cutting instrument, divided merely the face of the stricture, usually its hardest part, and then introduced a No. 4 silver catheter, which he, in several instances, succeeded in passing into the bladder.

Mr. Guthrie was an advocate, in some cases, for the division of a stricture from behind forwards; a method also recommended and practised by MM. Leroy d'Etiolles and Civiale.

Mr. Guthrie has told us that this mode of division can only be effected when the stricture is passable by a No. 4 at least; also, that "the operation is not one of necessity, but of choice, performed in the hope that it may lead to a permanent cure," which he thought "it is very likely to effect." The instrument used by Mr. Guthrie, he has informed us, "is round, straight, and of equal size throughout unto the end, the under part of which forms a bulb or ledge sufficiently developed to catch against the stricture when passed through it, and then withdrawn until it meets with the check the inner side of the stricture occasions by catching against the edge or bulb. The cutting part being then protruded on the under side by the pressure of the thumb on a spring, the instrument is to be drawn through the stricture, which it divides; the pressure of the thumb being removed, the cutting part returns into its sheath, or it may, if found necessary, be pushed forwards through the stricture, thus deepening and completing the cut already made, or even making another by the side of the first, if thought advisable. When the division of the stricture has been

accomplished, a straight sound, very slightly conical at the point, should be passed through it, until the distension begins to give pain, when it should be withdrawn, to be re-introduced next day, until, by successive introductions, and, if necessary, by successive divisions, the canal becomes free." Mr. Guthrie, with his usual candour, has informed us that, after this operation, "urine may be extravasated; matter may form externally, or be discharged in quantity from within;" also, that "these are accidents which may befal any one, although they do not often occur." The following highly important observations are added by Mr. Guthrie:—"In whatever manner the urethra may be divided, whether for a stricture only, or for a fistula in perineo, any and every operation may lead to the excitement of a fever resembling ague in its paroxysms, and to the formation of matter in different parts of the body, in a similar manner to that which I believe I was the first to show did often happen after amputation. It is a misfortune that cannot be avoided, and he is fortunate in whom these depositions of matter occur in parts not essentially vital."

The latter operation, division from within, by a cutting instrument, of a stricture sufficiently open to admit the introduction of a No. 4, is one that, in my opinion, should very rarely, if ever, be performed, as the caustic potash, in such cases, will usually prove equally, if not more, efficient, and has the additional advantage of being used with perfect safety to the patient.

The disadvantages attending division of strictures within the urethral canal by the lancetted catheter or other cutting instruments are of no trivial kind. First, the operation is effected in the dark, it being impossible for the most skilful operator to tell exactly what he has divided; secondly, it may chance, from the elasticity of the obstruction causing it readily to yield to the pressure of the cutting instrument, that a very small portion only of the stricture will be divided; thirdly, in other cases, where the obstruction is rigid and unyielding, the incision may also divide the parietes of the urethra, and extravasation of urine ensue; lastly, even supposing the incision to have been properly effected, either posteriorly by Mr. Guthrie's instrument, or anteriorly by Mr. Stafford's, there is still the disadvantage in division of strictures by this method, that when beyond a slight extent, they will mostly be exceedingly difficult to keep open,—a great objection to the operation, even if there were none other.

After reflecting upon this subject, I think it cannot excite much

surprise, that this operation should so often fail in affording permanent relief. The great majority of cases in which it can be at all justifiable, will be old, hard strictures, impassable to the bougie; and, before having recourse to it, we should well consider what is effected by its performance in such instances. Two incisions commonly, and sometimes three or four, are made by the lancetted catheter, in different parts of the hard strictured portion of the urethra, by which the surgeon is enabled to force the instrument through the obstruction into the bladder, and thus, by incision and laceration, the immediate object is perhaps gained. But to preserve this advantage, a catheter must be retained for some little time; or, if that cannot be done, a sound must be introduced, more or less frequently, to keep open the breach made in the obstruction.

It will be well for the patient, if he can bear for some few days the retention of a catheter in his bladder, as the wounded parts will then be protected in a great degree from the irritation consequent upon the passage of the urine.

Surgeons who have practised this operation, in cases where the obstruction is of more than slight extent, know that, although it may be possible to get a No. 10 catheter into the bladder immediately afterwards, yet should it be necessary to withdraw the instrument for a time, it will often be impossible, without using injurious force, to pass one of half that size. It should always be borne in mind, that the tissues divided in this operation have a strong tendency, from their elastic nature, to close again, especially when exposed to the passage of the urine. In some cases of the operation such severe hæmorrhage has occurred, as nearly to fill the bladder with coagulated blood, and cause the patient hours of agony from retention of urine. False passages have also been made, and extravasation of urine has sometimes occurred from the operation when accomplished even by those who had become most expert in its performance.

By the advocates for the use of the lancetted catheter, the account here given of the effects of that instrument, will doubtless be considered a very partial one. It may be said, and with truth, that the disadvantages, and not the advantages, have been described. The lancetted catheter, when used at the curved portion of the urethra, has indeed always appeared to me to be a very dangerous instrument; and I feel assured, that there are seldom any advantages to be gained by it that cannot equally be obtained

by safer means. I am very willing to acknowledge my strong dislike to the instrument; for in using it beyond the straight part of the urethra, I should dread every advance it made, feeling no confidence in its taking the right course. It must surely, under such circumstances, notwithstanding all that can be said in its favour, be a kind of stabbing in the dark, which is as likely as not to mistake its proper object.

In a hard, unyielding, gristly stricture, in the straight part of the urethra, which had resisted the application of potassa fusa, I should, however, prefer effecting division of the obstruction by the lancetted catheter to the operation by external incision.

When undertaken for the relief of a stricture in the curve of the urethra, it certainly appears to me, that the operation with the lancetted catheter is one in which the advantages that may possibly be gained are never worth the risk that must be incurred in its performance. The two following cases are, I believe, fair illustrations of the usual effects of division of strictures by the lancetted catheter; although that operation has certainly, in some instances, been attended with more satisfactory results.

Case 49.—*Stricture which had been divided by the Lancetted Catheter.*

Mr. Y., aged 53, admitted a dispensary patient, August 15th, 1850. Has suffered more or less from stricture for the last thirty years. Ten years ago, during an attack of retention of urine, his stricture was divided with the lancetted catheter by an eminent surgeon, which operation relieved him for a considerable time; but he had great difficulty afterwards in keeping the obstruction which had been incised sufficiently open; and for the last four years, the patient has been unable to pass an instrument of any kind. On his application to me, he had long been annoyed with dribbling of urine; and every attempt to empty his bladder is attended with very painful straining, seldom more than a table-spoonful, which comes away by drops, being passed at a time. Applied potassa fusa to a stricture at four inches, and repeated the application every third day until the 30th, when there remained scarcely any dribbling of urine, which is now voided in a small stream. On the 5th of September, I passed a No. 5 sound into the bladder; and by the 6th of October, the stricture was sufficiently dilated to admit the introduction of a No. 8. The patient's

attendance at the dispensary has since been so very irregular, that I have been content with passing for him the same sized sound.

Case 50.—*Stricture which had been divided by the Lancetted Catheter.*

July 3, 1851, I was consulted by a surgeon in extensive country practice, who had long been a great sufferer from stricture, having experienced frequent severe attacks of retention of urine. Between four and five years before his application to me, he had consulted the late Mr. Liston, who divided for him an obstruction at 4½ inches from the external urethral orifice. I was informed by the patient that Mr. Liston afterwards passed a No. 6 silver catheter into his bladder, and assured him that there was no other stricture than that which had been incised. By Mr. Liston's advice, he has occasionally kept in the urethra, for an hour or two at a time, a metallic tube long enough to pass through the divided part. The patient is obliged sometimes to ride a considerable distance on horseback, and then the difficulty of micturition is much increased, amounting often to complete retention, which is only relieved by large doses of opium. The stream of urine, which had considerably improved after the operation, has gradually become smaller, notwithstanding the regular introduction of the dilating tube. On examination with a No. 6 silver sound, which went with some little difficulty through the incised stricture, which was very rigid, about an inch long, and excessively painful, a second obstruction was encountered at the bulb, through which the instrument passed, after gentle pressure continued for a few minutes. The sound was very firmly grasped, and a little bleeding and irritation were caused by its introduction. This gentleman could only remain in town for a fortnight; and as his necessary avocations during that time required active exertion, I did not think it advisable to use the potassa fusa. I succeeded once in the introduction of a No. 7 sound into his bladder, which caused rather free bleeding, and so much urethral and vesical irritation, that I did not again use that size, but passed for him afterwards the No. 6, until his return to the country. I advised him not to increase the size of the instrument, until the No. 6 passed with facility. This patient was stout and highly plethoric, just the subject for hæmorrhage. I heard from him a few months afterwards, and was informed that he continued to pass occasionally the No. 6 sound, which enabled him to void his urine generally with tolerable comfort.

Since the preceding observations were written, my experience of internal section has been but little, and that little not the most favourable, as I have found great difficulty in keeping sufficiently open the aperture made by the knife. Except in cases of urethral contraction at the glans penis, in which, from its peculiar density of structure, free division by the knife is the proper and most effectual remedy, I have resorted to internal section but in two instances, which were urgent cases. In these, the strictures were at the straight part of the canal, and impermeable; it was, of course, necessary to divide them from before backwards by the lancetted catheter.

It will be seen that most of my remarks upon internal section relate to the method in which division of a stricture is effected from before backwards, which is the usual one practised in this country, as the operation has not often, except by Mr. Guthrie, been had recourse to in permeable obstructions.

The manner of accomplishing internal section of strictures by some of the French surgeons, by passing an olivary-headed urethrotome through the obstruction, and afterwards effecting its division when withdrawing the instrument, is undoubtedly a much safer proceeding than that by the lancetted catheter from before backwards.

Having myself had no experience of the mode of performing the operation of internal section of strictures, as principally practised by the French surgeons, by some of whom it is held in great estimation, I must endeavour to supply my own want of information on this subject in the best manner I am able. Of the French surgeons, none probably have had greater, if so much, experience of internal division of strictures as Civiale, whose high reputation and extensive practice in urethral surgery must render his opinion especially valuable on the subject. I shall, therefore, select from his "Traité pratique sur les Maladies des Organes Genito-Urinaire," those observations relating to internal section which appear to me to possess the greatest practical utility.

He observes, "that it might be supposed the idea of introducing into the urethra a cutting or piercing instrument, either for the purpose of opening a passage for the urine, or facilitating the dilatation of the strictured portion of the canal, would have occurred, nearly at the same time, as that of having recourse to sounds and bougies. And this is, in fact, what we learn from the information which has been transmitted to us by Galen, Alphonse

Ferri, Lacuna, Am. Lusitanus, &c. Galen speaks of callosities of the urethra which were destroyed by means of a catheter. Forced catheterism is indicated in other authors also—for example, in Jean de Vigo; Alphonse Ferri speaks of it in terms the most explicit. We know no more of the instruments then in use than of the manner of the operative proceedings. Here, as in the *boutonnière*, the slight details which are given by the authors upon the intra-urethral puncture, are too incomplete to lead us to anything precise; the only thing which can be positively understood from them, is that, from very remote times, this operation was known; and that the manner of proceeding was from before backwards, and without guide." "Ambrose Paré does not confine himself to terms so vague. Not only does he describe the steps which ought to be followed, but also those instruments proper for the operation, of which two are figured in his works."*

"Thus, we find already in Paré the idea of several instruments and proceedings represented in the present day as new; and also that of scarifications, as well as the employment of the bougie. The *canule fenêtre*, and the *stylet boutonné à bords tranchants*, have served as models of some of the instruments which have been introduced into practice of late years."

At a less distant period, the puncture of strictures was practised with confidence in serious cases, even upon eminent men in the profession. It will suffice to mention that Astruc had his life prolonged by it for ten years, this physician having been affected with a tumour near the neck of the bladder. The instrument used, and the proceeding practised by Lafage, did not notably differ from those now employed in impermeable strictures. The instrument consisted of a canula of the ordinary curvature, open at both ends, and containing a stylet of silver with a triangular point, which could be pushed out from the extremity of the canula to the extent of eight millimètres. As soon as this instrument, with its piercing point concealed within the catheter, had attained the obstacle, the finger having been introduced into the rectum, the central stylet was pushed forward with force; then, having perforated the obstruction, the puncturing stylet was withdrawn, and the sound retained in the bladder for some days. It is on the model of this canula used by Lafage, that have been constructed the instruments employed by Physick, Doerner, and Stafford,

* Œuvres Complètes, édition de Malgaigne. Paris, 1840. T. ii. p. 569.

and which have been more lately reproduced, with some changes often of doubtful utility. In effect, whether the curvature of the instrument be a little more or less; whether the cutting or piercing portion form at the extremity of the canula a greater or less projection, and whether it be propelled from the sheath by simple pressure of the hand by means of a spiral spring, or in some other manner, there will not be much difference in the principal action of the instrument. The apparatus is always passed along the urethra to the obstruction, after which its division is effected. Whether the blade resemble a lancet, or has some other form; whether it be thin with two edges, or thick and triangular in the fashion of a trocar, the difference as to the proceeding is reduced to very little.

Until of late years, with the exception of Ambrose Paré, urethral contractions have generally been divided from before backwards; an operation always hazardous. In 1819 Mr. J. Arnott proposed the employment of an instrument with two blades, which was to be passed through the stricture, and its division made from behind forwards.

In order of date, I here mention an instrument which I have used since 1823, to open the meatus, and to divide from behind forwards, and from within outwards, strictures close to the navicular fossa. It is a bistoury in a sheath, called an urethrotome, of which I gave a representation in 1826, in my work on Lithotrity. In 1832 appeared the Treatise of Mr. Phillips, in which are described some of the instruments formerly used, and those employed by himself.

In 1833, M. Reybard, for the division of strictures from before backwards, presented us with an instrument which he calls a "*coupe-bride*, or urethrotome." After commenting at some length on this instrument, and others of a similar character, Civiale informs us that, in the commencement of his practice in 1823, the requirements of lithotrity obliged him to seek a prompt and efficacious means of destroying the urethral contractions which so frequently exist in the neighbourhood of the navicular fossa, and which offer serious obstacles to the introduction of instruments, as well as to the passage of fragments of calculi. Finding the proceeding previously adopted to be defective, Civiale had an instrument constructed, which he calls an "urethrotome," and which he tells us has, during thirty-five years, rendered him the greatest services. To use his own words: "In the numerous applications

to external perineal section, because a very narrow stricture admitted a stylet conductor more easily than an olivary-headed urethrotome; but that objection is valueless, for as soon as a stylet passes, it is sufficient to introduce a catheter, and allow it to be retained for two days, by which such a degree of dilatation will be obtained, as to allow of the passage of the urethrotome. Besides, urethrotomes are made of all sizes. The smallest of those I use (Fig. 1) has an olivary end of three millimètres in thickness and four in breadth: with this instrument, armed to the third or fourth degree, a preliminary incision can be made sufficiently deep to permit the immediate and easy passage of the urethrotome No. 2, which I employ in the generality of cases; its olivary head has a breadth of five millimètres and a thickness of three millimètres. (See Fig. 2.) The urethrotome No. 3, the olivary head of which is broader and thicker by from two to three millimètres, is especially designed to complete the division of the fibrous tissues in serious cases, when the indurated mass, long and thick, requires a division of greater depth than can be made by the No. 2 instrument."

With regard to the length and depth of the incision, the limits to which it should be confined in diverse cases, Civiale makes the following remarks:—"It is at the anterior extremity of the urethra, that we can act with the greatest certainty. In regard to this region of the canal, many thousand facts have fixed my opinion so firmly as to leave no doubt on my mind. In the case of a simple bridle obstruction, the incision varies from six to twelve millimètres in length, and from two to eight in depth, following the diameter of the canal to its orifice. If there are two strictures occupying the two extremities of the navicular fossa, the depth is the same, and the length varies from twenty-seven to thirty-four millimètres. The incision may surpass this length, if the stricture is prolonged backwards, or if there exist an induration and considerable swelling of the extremity of the penis. Here, especially, it is better to cut too much than too little. It is from not having included in the incision, in length and breadth, the whole of the indurated tissues, that incomplete cures and a return of the disease have been observed. In all cases we should be able to introduce, two or three days after the incision, through the divided part, a bougie from seven to eight millimètres in diameter, according to the normal capacity of the canal."

"At the pendulous part of the urethra, my personal experience

does not permit me to be so positive. However, the great number of observations which I have made during a long time, authorizes me to say, that in all this region of the canal we can now proceed with a precision which will meet every exigency, especially when the stricture is simple; and that it forms under the integuments a nodosity, or ring, perfectly circumscribed and distinguishable by the touch. The depth of the incision varies from seven to nine millimètres; the length is proportioned to the extent just before, and behind, the contracted point. When the stricture is not circumscribed, or when there exist several obstructions a little distance from each other, forming at the inferior surface of the urethra a series of bridles, of bands, or of swellings, variable in their projection, their extent, and the distance which separates them, it is not as easy as one might think to make a vigorous application of established precepts. In these circumstances, practice often reveals difficulties which could not be foreseen; besides the causes of error which I have signified in regard to the previous explorations,—to the mobility of the indurated tissues, to their resistance, and to the displacements which they undergo during an examination. Here, as at the meatus urinarius, the incision should be sufficiently deep to divide the whole thickness of the indurated tissues, and prolonged before, and behind, the contraction, so that the wound should not be peaked, either on one side or the other. From the preceding observations, it is evident that the total length of the incision will vary according to the number of strictures met with at a certain distance one from another. At the deep part of the urethra, the touch furnishing but vague notions, the uncertainty with regard to the length of the incisions is much greater.

"Certain strictures require to be divided but once; but there are others which it is necessary to divide several times. Experience must decide whether complete division should be effected at one time, or at more or less distant intervals." After having passed the olive-headed urethrotome through the stricture, Civiale observes, "But at the moment when the operator draws the instrument towards himself to effect the section, the strictured part is drawn forwards to the entire extent to which it had previously been pushed backwards on the introduction of the urethrotome; sometimes even more, and that according to the degree of hardness and resistance of the diseased parts, and of the fitness of the instrument to cut. This double displacement of the stricture,—backwards, from the effect of the pressure; forwards, by that of traction,—causes always

sufficient to permit the passage of the olivary urethrotome, the operation should be performed. All delay can only be prejudicial. The same method of proceeding which has been previously described should be adopted, never losing sight of the fact, that the length and narrowness of the stricture may render more difficult the passage of the olivary head of the instrument through the obstruction. When that end is attained, the urethrotome should be armed to the third or fourth degree; and the thickened tissues being fixed by the fingers of the left hand, the instrument is to be drawn forward with a force proportioned to the resistance which the indurated structures oppose to the cutting blade.

"This resistance being sometimes very considerable, it is necessary to exert a traction which drags the nodosity before it, notwithstanding the pressure of the fingers and the proper fitness of the blade for the incision. In order to regulate his movements, the surgeon supports his elbow against his own body, or his forearm on the patient's thigh. If he operates with his arm extended, in drawing strongly on the handle of the urethrotome, the sudden cessation of the resistance, after division of the callosity, may prolong the incision in front of it in the healthy parts of the canal much more than is necessary.

"The surgeon must not lose sight of the fact, that in hard strictures, with deep transformation of the tissues, he can reckon but little on consecutive dilatation, and that the indurated parts ought to be completely divided. It is almost always necessary, after the first incision with the small instrument, to practise immediately a second on the same part with a larger urethrotome, with which the blade may be made to project from five to eight millimètres, according to the thickness of the obstruction. Within this limit, not only is there nothing to fear in exceeding the thickness of the diseased parts, but most commonly, on the contrary, the obstruction is not completely divided, and it is necessary afterwards to extend the incision.

"After division of the stricture, it should always be the rule to introduce a catheter, which is to be retained for the proper period, and afterwards bougies must be passed to prevent the lips of the wound becoming united. It is commonly towards the inferior urethral surface that the incision should be made; but when the nodosity occupies the superior parietes, or one side of the canal, which is rare, it is towards those points that the cutting blade of the instrument should be directed, taking care to cut less deeply.

Whether a single incision, or more, have been made, it is always necessary that the indurated tissues forming the nodosity should be completely divided. To attain the limits of the disease and not to surpass them is often difficult, especially for those who have not had considerable practice in urethrotomy. Some surgeons, amongst those who always incise, do not acknowledge this difficulty, but exaggerating the precept, very wise when applied with the reserve which I have previously enunciated, they have contended that it is better to cut more than less. Although the excess in the length of the incision has not generally been followed by consequences so serious as might be supposed, whenever there is an uncertainty in the mind of the surgeon, it is better to operate at several times, and resort to the use of the cutting instrument when it has been found, after some days, by the aid of bougies, or button-headed stylets, that there yet remain some indurated, undilatable tissues, forming the nodosity not entirely divided. It is this proceeding which I have employed in a great number of cases, and with such advantages that I do not hesitate to recommend it to practitioners."

"*Third series of cases.*—Several strictures; very long strictures, with thickening of the urethral parietes, or diminution in their size; strictures complicated, with other lesions of the neighbouring parts."

"1st. The multiplicity of organic strictures in the same individual requires some changes in the mode of performing urethrotomy. I put aside for the moment strictures in the vicinity of the navicular fossa, which form a category apart. With regard to those which occupy the pendulous and sub-pubic regions, it is necessary to bear in mind that they are sometimes bridiform, and sometimes consist of indurations more or less extended; 2nd, that they are close together, or separated to a certain extent from the healthy portions of the canal. In these diverse cases, the surgeon does not proceed in the same manner. Let us add, that the preparatory treatment presents also some difficulties. To procure sufficient dilatation of the contracted points for the passage of the olivary urethrotome, often requires a long time, and repeated applications of the bougie and of urethrotomy from before backwards. Nevertheless, when a small urethrotome can be passed beyond the last stricture, the difficulties cease. In the less severe cases, and if the strictures are close together, an incision can at once be made, which will divide them all, without disarming the

instrument, and regardless of the intermediate parts, which, preserving a certain elasticity, yield before the instrument, which, from its small size, divides merely the more superficial and resisting points of the morbid tissues. When withdrawing the instrument during the operation, it traverses the canal by jerks, the olivary extremity passing from stricture to stricture, without being at all pressed in the intervals, although the urethrotome remains armed to the same degree. In ten of such cases in which I have operated, the incision has been more than thirteen centimètres in length. This first division has been immediately succeeded by a second of the same extent and deeper, by means of the No. 2 urethrotome, when, in place of bridles, I have had to deal with strictures long and knotty.

"It is from experience, that I have been led to practise these long incisions, necessary in this category of cases, but which are more apparent than real, since they reduce themselves to isolated divisions of the contractions, the intermediate healthy tissues being only superficially scratched. I have thus acquired by experience the certainty that they can be practised without danger to the patients.

"When the contracted parts of the canal are separated by long intervals, another manner of proceeding must be adopted. I suppose always that a sufficient dilatation has been previously obtained for the passage of the urethrotome beyond the last stricture. The surgeon then divides that as if it were the only one, and attacks the others successively; but instead of letting the instrument remain armed, as in the preceding cases, he makes the blade recede within its olivary sheath, after the first stricture has been divided, and continues to draw towards him the disarmed urethrotome, until it meets with the next contraction, where it is arrested. He then again arms the instrument, and divides the indurated tissues through their whole extent. In general, after this first incision with a small urethrotome, a second should be made with a stronger instrument, and the treatment continued as previously directed. It is commonly the furthest stricture which offers the greatest difficulty to the passage of instruments; and sometimes the passage of these instruments is impossible. The indication, then, appears to be to incise the stricture nearest the meatus, as if it were the only one, without regarding the other. But this practice has its inconveniences and dangers, which should cause the surgeon to be circumspect. There is the impos-

sibility of introducing a catheter into the bladder, because of the deep stricture not yet opened, so that it is not possible to guard the sound from contact of the urine; besides, it is well known how difficult it is, when a deep stricture exists, to preserve the enlargement gained by the division of the tissues, and that the benefit of the first operation is very soon lost. However, it is necessary to act in that manner; but in order to prevent, or at least to lessen, the chance of accidents, a superficial incision only should be practised on the first contraction—a sort of scarification (*débridement*), destined to facilitate the passage of small bougies, so as to be able to act afterwards on both strictures at once."

"In operating on very long, hard strictures, after having, by the usual means, prepared the canal for the introduction of a small olivary urethrotome, the surgeon passes it beyond the posterior limit of the disease, arms it to the second degree, and withdraws the instrument in the ordinary manner, after having divided by a single stroke all the altered tissues. In the commencement of my practice, I used to rest content with this; but experience has taught me, that it is preferable to have recourse immediately to a second incision, like the first, with a larger instrument. The hardness of the tissues preventing the introduction of soft bougies, or even the smallest sound, may sometimes render it necessary to resort to the aid of stylets, or of urethrotomy from before backwards. But the obstruction often resists whatever can be done by preparatory treatment. We are then reduced to have recourse to the division of the stricture by parts. But this proceeding is neither easy, nor even always possible. These partial incisions, in a very long stricture, never having completely satisfied me, I do not advise them, at least, as a general method. In cases, even when, by the employment of bougies, it has been possible to preserve a certain degree of enlargement of the divided part, some deformation of the canal is to be feared at the point where the incision has commenced, which aggravates the situation of the patient, and renders more difficult the subsequent treatment. It is the case, at least, under many circumstances in which recourse should be had to external urethrotomy."

"In general, when the parietes of the urethra are extensively thickened, as is most frequently the case, it is necessary, I repeat, to give the incision a length and depth sufficient for the division of the whole of the transformed tissues. But in cases of very long strictures, when the canal is reduced to the state of a ligamentous

cord, the limits of the incision in the thickened tissues ought to be more restricted. When recourse has been had to temporary dilatation exclusively, or to dilatation combined with incisions, it not rarely happens that the canal will not regain the size which is required, and that its parietes preserve in some parts a certain rigidity. The large bougies continue then to be grasped: their introduction causes pain, which is followed by reaction, and the treatment remains incomplete, and may even be attended by new accidents, if the surgeon does not divide more deeply and extensively the indurated tissues, which form the principal obstruction; or others less developed, which have not yet been sufficiently acted upon by the cutting instrument. Amongst these last, are the bridles, the fibrous bands behind and especially before the principal stricture. To remove these relics of long and hard strictures, and to divide the bridles or bands which paralyse the action of dilating measures, and prevent the restoration of the urethra to its normal state, the proceedings of urethrotomy commonly used, succeed with difficulty. The large size of the urethrotome which M. Reybard recommends to be employed under such circumstances, has the inconvenience of causing distension of the canal, as well as pain, and so rendering the operation more or less laborious. I have recourse to a more certain proceeding, which consists in introducing beyond the contraction my third urethrotome, which indicates, by means of its large olivary head, the point or points of the canal which still offer resistance; and as soon as the situation and extent of the morbid tissues are understood, the instrument is armed to the second degree, so as to cause the blade to project from the olivary extremity from four to five millimètres. These dispositions having been made, the surgeon supports, by the pressure of his hand, the extremity of the instrument thus armed, against the surface to be divided, and by drawing on its handle, causes the blade to penetrate the morbid tissues to the whole of its extent beyond the olivary protuberance. The division is effected with facility and precision."

"By this proceeding, at once simple and certain, I have divided a great number of bridles and fibrous bands of commencing strictures which resisted dilatation, or returned with a force and rapidity proportioned to the distension to which they had been subjected, and which perpetuated the mischief. I have completed, in this manner, the division of considerable masses of indu-

rated tissues, retractile and refractory to every other kind of treatment.

"It is with the same kind of instrument that I now divide, in almost all cases, the urethro-vesical barriers."

"*Consecutive Treatment.*—Most surgeons recognise, in the present day, the utility of placing in the urethra, a flexible gum catheter after urethrotomy. The catheter, rather small than large, should be introduced just within the bladder, and there fixed by the usual method. It should be retained for one or two days, rarely more, and sometimes less: should its retention become distressing, absolute rest must be enjoined; and instead of a bath, I commonly order a large cataplasm of a mild temperature to be applied, and which should be removed once or twice in the day."

If the retention of the catheter should cause much irritation, instead of retaining it for the time previously recommended, Civiale advises its removal at the end of some hours after the patient has micturated two or three times, as it is necessary at first to prevent the contact of the urine with the wound. Civiale remarks, "This effect of the contact of the urine with the wound is the more remarkable, as, after the catheter has been retained for some hours, the effect either does not occur, or is at least greatly diminished. In the great number of operations which I have performed in this region, I have never known a necessity for the permanent retention of the catheter, and no serious accident has happened. At the pubic portion of the canal, and especially towards the bulb, the retention of the sound is the more necessary in proportion to the depth and extent of the urethral incision. The presence of the sound in the urethra after division of the stricture, has appeared to me to suffice in the great majority of cases for the prevention of fever, hæmorrhage, infiltration of urine, inflammation of the urethra, swelling of the lips of the wound, &c., so frequent when the precaution of having recourse to the retention of the catheter has been neglected."

"In cases where there are several strictures, when all have not been divided at the same time, the one which has not been incised not permitting the introduction of the catheter into the bladder, a small catheter of medium size should be placed in the canal beyond the incised part, and there fixed in such a manner that the patient can remove it if necessary." Civiale recommends, some

few days after urethrotomy, the gentle introduction of bougies; or if they cannot be passed, of metallic sounds, until full and satisfactory dilatation is effected. The greatest care of, and vigilant attention to, the patient, after he has been submitted to urethrotomy, is strongly enforced.

In describing the accidents resulting from urethrotomy, Civiale makes the following, amongst other, important remarks:—

"One general and incontestable fact is, that whatever may be the proceedings by which strictures are divided, as well as the operations of catheterism, they are all liable to provoke serious accidents." These effects, with which experienced surgeons are familiar, are well described by Civiale, who recommends, as a general rule, before resorting to urethrotomy, that the sensibility of the urethral canal should be as much as possible diminished by the previous introduction of bougies. The whole of Civiale's observations on urethrotomy are highly interesting, and should be attentively studied by every surgeon interested in the subject of urethral surgery; a branch of the profession in which that eminent physician has acquired an European reputation.

From the peculiar and original views of M. Reybard regarding the pathology of urethral stricture, his opinions relative to the treatment of that disease, as might be expected, differ materially from those which are commonly entertained. This is more particularly shown in his strong advocacy of the performance of urethrotomy in almost all cases of urethral strictures, except in their very early stage. To the peculiarity of M. Reybard's views relative to the pathology of stricture, I have elsewhere alluded. A general idea of M. Reybard's doctrines regarding urethrotomy may be acquired from a perusal of the following abstract from his "Traité pratique des Rétrécissements du Canal de l'Urètre:"—

"It was in 1833 that I acquired the certainty of the advantages and innocuousness of deep incisions of the urethra. It is from this epoch that I date, really, my new mode of operating." "Finding that strictures returned nearly as frequently after complete division, as after scarification, I made, in 1842, new experiments on wounds of the urethra, thinking, from facts which presented themselves to me, that the want of success of the operation might have its source in the too restricted dimensions of the wounds, and their mode of cicatrization. The new experiments put me soon in possession of a more perfect method, which I have exposed in my 'Mémoire pour le Concours du prix d'Argenteuil'

(1844). These experiments inspired me with the boldness to divide the canal in its whole thickness in the neighbourhood of the obstruction; and since then, I have really obtained a considerable and permanent enlargement."

M. Reybard's method of urethrotomy may be briefly explained as consisting, 1st, of "freely incising the stricture from within, and carrying the incision completely through the parietes of the canal to the external cellular tissue. The incision," we are informed, "is in length from five to six centimètres, and in depth about four millimètres. 2nd, To prevent the reunion of the edges of the wound, to cause them to cicatrize separately, and obtain in the interval which results from their separation a cicatrix thin, supple, and wide." It is with an urethrotome of his invention that he accomplishes the first indication, and by taking the precaution to keep the borders of the division apart with a sound or other dilating means, that he accomplishes his second object. M. Reybard remarks, "Though the parietes of the urethra are very thin, it is, however, so uncommon to cut them completely, that urethrotomy constitutes one of the most delicate operations of surgery. Its difficulties are also so numerous, that I have sought during ten years an urethrotome which permits me to divide the urethra in a manner sure, regular, and complete. It will readily be comprehended that the imperfections of my first instruments have rendered me often incapable of practising suitably this operation, and that I have had numerous returns of strictures formerly urethrotomised."

M. Reybard observes, that "Urethrotomy is applicable to all regions of the urethra; but for contractions distant from the meatus not more than two or three centimètres, it ought to be practised in preference with a simple narrow bladed bistoury, with its point protected with a little piece of wax, softened by the warmth of the fingers, or better with a tenotome, or better still with the *bistouri à gaîne* of Blandin."

"The incision should be practised on the inferior surface of the urethra, and ought to be sufficiently deep to include not only the urethral tunics, but also the aponeurotic membrane, which forms a fibrous sheath to that canal, and embraces it tightly."

"*Extent of incision in Urethrotomy.*—Experience has taught me that it is necessary to make an incision of from six to seven centimètres. It is better even to extend the limits of the incision, which should be commenced a little behind, and terminate a little before

the stricture. This length is necessary to obtain an intermediate cicatrix of sufficient dimension to restore the canal definitively to its normal capacity." M. Reybard, after describing at some length the accidents which may occur after urethrotomy, and their proper treatment, makes the following highly important observations:— "Although urethrotomy be one of the slightest and least painful operations of surgery, it, however, merits very serious attention, since it may be followed by death almost immediate, in the space of twenty-four hours. I have had the misfortune to deplore one such case. The persons who have been urethrotomised by one or other proceedings, and who have died, have been attacked by fever. Certain accidents may retard the cicatrization of the urethral wound. These are inflammation of the wound; abscess in the parietes of the urethra; consecutive hæmorrhage; phlebitis; and purulent absorption." Leroy d'Etiolles' opinion of this method of urethrotomy is not the most favourable. The following are his observations upon this subject:—"The applications of M. Reybard's proceedings which he made in Paris are not, however, of such a nature as to make others participate in the confidence which he had in the treatment. I have seen three of his patients at the Hôtel Dieu: two died of purulent absorption; the third, who afterwards went to La Pitié, has had hæmorrhages so copious as to cause serious fears." Civiale, also, relates some unfortunate results from the performance of Reybard's operation.

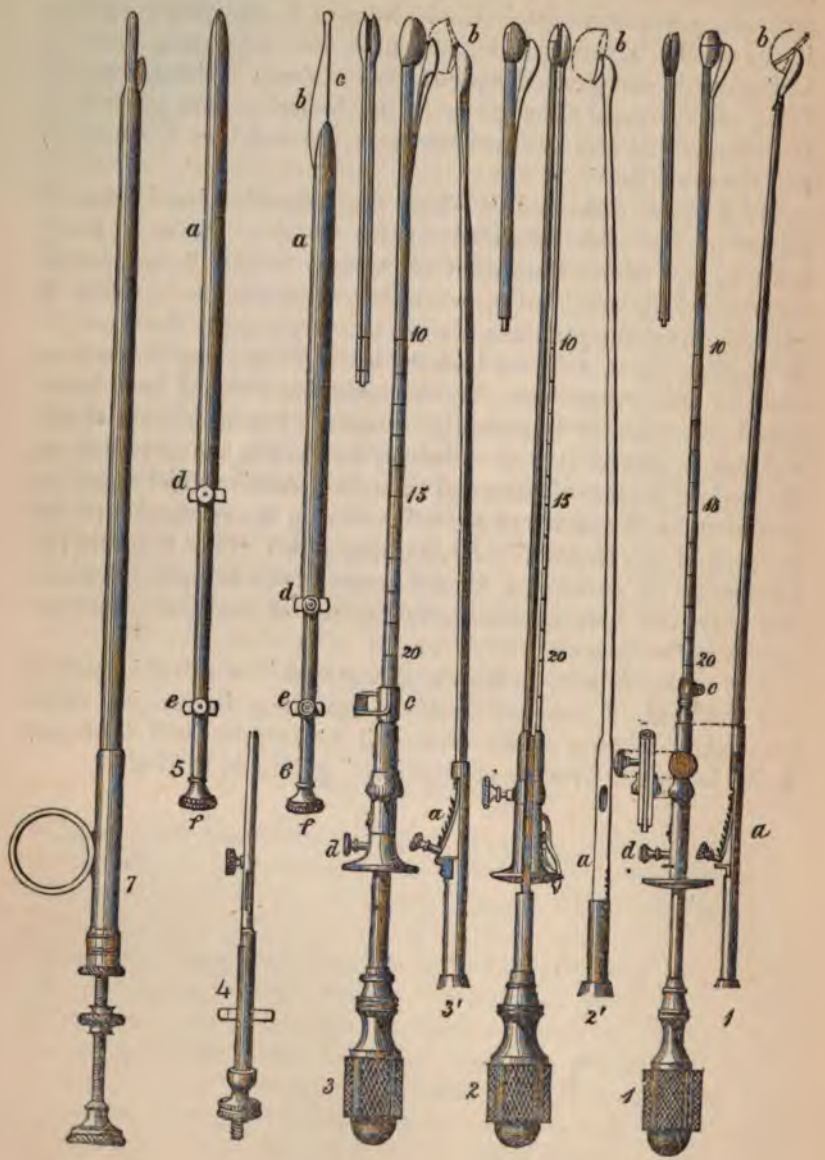
EXCISION OF STRICTURES.

Leroy d'Etiolles speaks highly of excision. We are informed by him that the first idea of this method belongs to Ambrose Paré, who used a flexible stem, at the end of which was a cone, sharpened at its base, with which he scored more than excised what he called carnosities. It appears from the statement of M. Leroy, that Paré had no imitators; and that it was only in 1812, that James Arnold, in a case of complete retention, removed the parts forming the stricture with a tube sharpened round its extremity. Mr. B. Phillips, in his "Treatise on the Urethra," published in 1832, gives a drawing of an instrument which he constructed for the excision of strictures. The following is Mr. Phillips' description of his instrument:—"It presents a circular cutting edge, is introduced into the urethra in a canula, and when the canula is in contact with the stricture, a probe or stylet, situated in the centre of the

cutting portion, is gently introduced into the orifice of the stricture, and serves to maintain the instrument in the proper position in the canal. The cutting instrument is then advanced, placed in contact with, and pressed against the stricture; a circular motion being at the same time given to it, similar to that given to a trephine, and in two or three moments the stricture is removed, and the canal free."

Mr. Phillips observes: "Where the induration has become so excessive that the indurated matter acquires almost a horny texture, and where the extent of surface which it occupies is inconsiderable, and, lastly, when any circumstance renders it necessary that the stricture should be very rapidly destroyed,—in all these cases, I do not hesitate in recommending the employment of this instrument. By the operation which I have introduced, the obstacle is instantly removed, after which an elastic catheter is passed into the bladder, for the purpose of protecting the excised portion of the canal from the irritation which would be produced by the escape of the urine during the evacuation of the contents of the bladder." Mr. Phillips adds: "But to insure the advantages of excision, I cannot conceal from myself that much dexterity and long experience in the use of the instrument are necessary."—*Opus cit.*

Having never seen, or known of, any case in which this method was adopted, I can say nothing regarding its merits. Full particulars relating to the treatment by excision will be found in M. Leroy's "Treatise on Stricture," published in 1845.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EXPLANATION OF CIVIALE'S INSTRUMENTS FOR THE PERFORMANCE OF URETHROTOMY.

"Fig. 1.—Urèthrotome No. 1, monté et armé au deuxième degré; et 1′ la tige porte-lame *a*, avec le bouton, et la crémaillère *d*; la lame, *b*, fixée au porte-lame par une charnière. Cet instrument est muni d'un curseur *c*. A côté se trouve une portion de la tige à laquelle est fixée la vis de pression.

"Fig. 2.—Le même instrument, plus gros; la lame fait corps avec la tige porte-lame, et le mécanisme de la crémaillère est en dehors. Sur la tige du porte-lame, 2′, est une entaille, dans laquelle la vis de pression fait arrêt pendant la manœuvre, et empêche l'instrument d'être desarmé.

"Fig. 3.—Gros urèthrotome, destiné à des usages, qui seront ultérieurement indiqués. Le talon de la lame est recouvert, afin de diminuer l'étendue du tranchant. Le bouton *d* porte une aiguille couchée, qui fait connaître le degré d'écartement de la lame. 3′. Tige porte-lame avec la crémaillère, et le bouton, en saillie. La tige de cet urèthrotome présente assez de résistance pour qu'on puisse appuyer fortement la lame contre les tissus, et les diviser comme on le ferait avec le bistouri. A côté de chaque bout olivaire des instruments se trouve une autre figure représentant le même bout, mais sous une autre face.

"Figs. 4, 5, et 6.—Urèthrotome coupant d'avant en arrière. Il est formé d'une gaîne aplatie *a a*, dans laquelle on fait glisser une lame *b*, surmontée d'une tige olivaire, ou cylindrique *e*, de deux vis de pression *d d*, et d'un curseur *e e*, servant à régler la sortie de la lame et à fixer celle-ci dans sa gaîne. Une rondelle épaisse *f f* sert de poignée."

Fig. 7.—Mr. Ure's urethrotome, made by Pratt of Oxford-street, consists of a silver canula, about eight inches and a half long, and one-sixth of an inch in diameter, tapering at the extremity for the extent of half an inch. In this tapering portion is a narrow longitudinal slit about three-fourths of an inch long, through which a delicate convex-shaped blade, one-twelfth of an inch broad, attached to a steel rod, can be made to project at pleasure from the canula, by simply pressing against the button, and which is afterwards drawn back into its sheath by the action of a spiral spring. In the figure, the blade is represented as protruded from the extremity.

CHAPTER XI.

EXTERNAL DIVISION OF STRICTURES—PERINEAL SECTION.

The words perineal section and perineal sectionist have of late become so notorious from the offensive personality with which they have been connected, that I would gladly avoid any further discussion of the subject to which they relate; but that its high importance, being often a question of life or death, compels me in this place to examine strictly the merits of the now too familiar operation of perineal section.

Division of strictures by an opening in the perineum is not a modern operation, having, as it appears, been occasionally performed in this country as long ago as the time of Wiseman, by some of the ablest surgeons of their day; but only in cases in which there remained, apparently, no other chance for the relief of their patients. The operation was also performed more than a century ago by some of the French surgeons, and was called "la boutonnière," or button-hole incision of the urethra.

Of late this operation has been rather the fashion; and I cannot but think that it has been performed much too frequently—that is, in cases which might have been equally benefited by safer means. Perineal section has always appeared to me to be an operation far too perilous, as well as unsatisfactory in its results, to justify its performance, except as a last resource under circumstances of immediate or imminently impending danger.

In the common method of its performance, a staff or silver catheter is passed as far as the stricture, and pressed firmly against it; an incision being then made through the perineum upon the point of the instrument, the knife is carried backwards so as to divide the contraction, and to open the urethra beyond. A gum, or silver, catheter, usually the former, is then introduced and fixed in the bladder, the object of the proceeding being to procure a free communication between the two permeable portions of the

urethra by division of their intervening obstruction. In cases in which the urethra, to some extent, at the seat of disease, is converted into a gristly mass, it cannot be expected that the passage made by the knife will be exactly in the track of the original channel. It is certainly just as likely to be effected through the diseased tissue by the side of the natural passage; and it will often be very difficult to keep the new one sufficiently open for the free evacuation of the urine. This tendency in the new channel to contraction is not, however, all that is to be feared, for this operation has frequently proved fatal. That hæmorrhage may sometimes occur to a great extent, and even cause death, we have evidence in some cases in which this operation was performed by Mr. B. Cooper; they are recorded in Guy's Hospital Reports. In the first of these cases, the man bore the operation well, but secondary hæmorrhage occurred to an extent that had nearly proved fatal. In the second case, there was considerable bleeding during the operation and afterwards; but it was eventually stopped by pressure on the pudic artery. In the third case, hæmorrhage proved fatal a day after the operation. In the remaining case, it is stated that a considerable quantity of blood was lost during the operation; the patient, however, eventually recovered. In some instances in which this operation has been resorted to, constitutional irritation of a grave character supervened, the patients having gradually fallen into a typhoid state, and died a few days afterwards.

Valuable information on the results of perineal section will be found in some observations on that method of treatment, by Mr. Henry Smith, in Nos. 553, 556, and 557, of the *Medical Times*. In eleven of the cases recorded by Mr. Smith, the operation was had recourse to in impermeable strictures, the result having been fatal in four. In the remaining four of Mr. Smith's cases, the obstructions were permeable, and Mr. Syme's operation was performed, the strictures having been divided on a grooved staff previously passed into the bladder. In one of these cases the operation proved fatal a fortnight after division of the stricture. In the *Lancet* of June 29th, 1850, are recorded three cases in which Mr. Syme's operation was performed by Mr. Cock, division of the stricture having, in one instance, been followed by the death of the patient. Of the fatal case we are informed, that "the patient was taken to bed in a singularly depressed condition. The loss of several ounces of blood increased

the prostration from which he never rallied. The next day his irritability became extreme, and he could not bear the pressure of the catheter. Symptoms like those of phlebitis soon occurred; he continued to get worse, and died five days after the operation." It was found, on *post-mortem* examination, that the edges of the wound in the perineum were sloughy, and all the veins forming the left prostatic plexus more or less filled with coagula, in some parts adhering to the lining membrane of the vessels, but no pus was detected. Some of the veins constituting the right plexus were likewise inflamed. Phlebitis was at the time prevalent in the hospital. A case of perineal section, by Mr. Gay, which proved fatal on the fifth day, is recorded in the *Medical Times* of November 5th, 1850.

That perineal section, as commonly performed, is somewhat perilous, we have of late had sufficient proof. It must also be admitted that no surgeon, by the performance of this operation, can insure a patient against a recurrence of his stricture. We have some valuable information upon this point from Mr. Guthrie, in his work on "Diseases of the Bladder and Urethra." The following statement is instructive:—"In the course of the last thirty years I have had many opportunities of dividing, and more of seeing the urethra divided by others, for the relief or cure of persons labouring under strictures. In most of these cases, the disease has returned in the course of a few months, or would have returned if the patients had not made use of the solid sound regularly every five or six days to prevent it. In the year 1816, I saw the late Mr. Pearson divide a stricture at the part where the scrotum begins, for the extent of an inch, or as much as was hard and gristly. The patient got quite well, and could pass a bougie with ease; but he subsequently neglected himself, and one year afterwards I saw him as bad as ever. In some cases, however, the results of this operation have been very satisfactory, there having been but little disposition to a return of the contraction." Surely no surgeon of ordinary judgment would ever think of resorting to this operation except in cases of emergency, or as a last resource, when all other means of relief had been tried and failed.

In a late work by Professor Syme, that gentleman, after having strongly condemned the usual method of performing perineal section, recommends division of urethral obstructions upon a grooved director, which of course facilitates the proceeding. Mr. Syme describes his operation as "a simple and easy mode" of

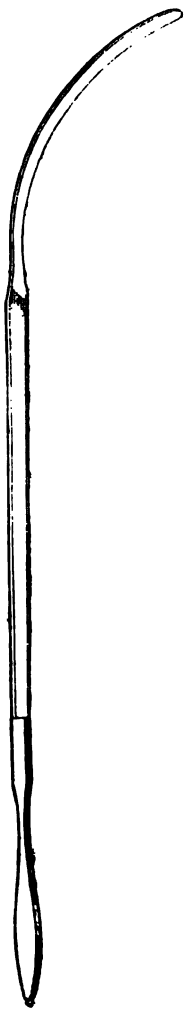
curing permanently the most difficult cases of stricture of the urethra, and unattended with danger to life. This operation is of course only applicable to permeable obstructions; but it appears that Mr. Syme does not believe in the existence of a stricture impermeable to instruments, as is evident in the following passage from his work:—"The operation by external incision hitherto employed, has been resorted to as the refuge of awkwardness or failure in the introduction of instruments, there being no truly impermeable stricture."—P. 57.

It appears that a similar method of performing perineal section had been long ago practised in France, as will be seen on perusal of Dessault's treatise on "Diseases of the Urinary Organs," edited by Bichat. This subject, bearing upon the question of Mr. Syme's originality in his operation, has excited some discussion in the medical journals. I have here alluded to the fact merely as a matter of history, and not as reflecting the slightest discredit upon Mr. Syme, who, when first publishing on the subject, doubtless believed that his operation had not been previously performed.

That Mr. Syme's operation is not always a safe one, has been sufficiently proved by two published cases, attended with fatal results, which occurred in London. At one of these cases I was present during the operation, which could not have been more skilfully performed, a No. 6 grooved staff having been previously passed into the bladder. The patient, undoubtedly, died from the effects of the operation within a fortnight from its performance. In Mr. Cock's fatal case, phlebitis occurred; but it is stated that "the man was taken to bed in a singularly depressed condition," and that "the loss of several ounces of blood, a few hours after the operation, increased the prostration, from which he never rallied." In one of Mr. Syme's cases, that gentleman acknowledges the result to have been all but fatal from erysipelas.

Mr. Syme's method of performing perineal section is as follows:—"The patient, having been put under the influence of chloroform, and held at the edge of his bed, in the same position as that for lithotomy, a grooved director, slightly curved, and small enough to pass readily through the stricture, is next introduced, and confided to one of the assistants. The surgeon, sitting or kneeling on one knee, now makes an incision in the middle line of the perineum or penis, wherever the stricture is seated. It should be about an inch or an inch and a half in length, and extend through the integuments, together with the subjacent textures

exterior to the urethra. The operator, then taking the handle of the director in his left, and the knife (which should be a small, straight bistoury) in his right hand, feels, with his forefinger guarding the blade, for the director, and pushes the point into the



SYME'S GROOVED DIRECTOR.

groove behind, or on the bladder side of the stricture; runs the knife forward so as to divide the whole of the thickened texture at the contracted part of the canal, and withdraws the director.

Finally a No. 7 or 8 silver catheter is introduced into the bladder, and retained by a suitable arrangement of tapes, with a plug to prevent trouble from the discharge of urine." (See "Stricture of the Urethra." By James Syme, F.R.C.S.E. Edin. 1849.)

We are informed by Mr. Syme, "First, that division of a stricture by external incision is sufficient for the complete remedy of the disease in its worst form; secondly, that in cases of less obstinacy, but still requiring the frequent use of the bougie, division is preferable to dilatation, as affording relief more speedily, permanently, and safely."—P. 28.

In a former publication I expressed my doubts as to this operation affording a permanent cure of stricture, for the following reasons:—First, that the thickened tissue is not removed by the knife in Mr. Syme's method any more than it is in the one which had been commonly adopted in impermeable strictures; secondly, that although a grooved director in the new method is passed into the bladder as a guide to the knife, by which the central line of the urethra is more certainly preserved than when no director can be passed, yet the natural urethral membrane can form but a very small portion of the enlarged passage, the greater part of the new channel being necessarily made through the condensed tissue at the seat of disease. (Vide the *Lancet*, January 26, 1850.)

Time only can, however, decide the question whether Mr. Syme's operation, in pervious strictures, be attended with more lasting success than when division is skilfully accomplished in impermeable cases; for at present we have no satisfactory evidence of the superiority, in this respect, of the former over the latter. By far the most important point, however, for consideration, with regard to Mr. Syme's operation, is as to the absolute necessity for its performance. When an instrument can be passed through a stricture, is it possible or not equally to afford relief by less hazardous measures, in which there is no risk of a fatal result? That it is so in most instances will, I think, be evident to any one who carefully reads the cases treated by me with potassa fusa.

It appears that Mr. Syme has hitherto performed his operation without any fatal result; but that his views regarding its curative powers are somewhat changed, is evident from the following passage in the *Monthly Journal of Medical Science*, for July, 1850:—"It was for the relief of those obstinate and contractile strictures that I some time ago recommended external excision upon a grooved director, conveyed through the seat of contraction, on the ground

of its being absolutely free from danger to the patient's life, certain to afford complete relief to all the symptoms of the disease, and probably sufficient, in general if not always, to protect him from future inconvenience." If a bougie be permitted to remain in these "obstinate and contractile strictures," but for "one or two seconds," then indeed the knife must often do the work which the bougie is not permitted to accomplish. I must once again quote Mr. Syme: "It is now universally admitted that the bougie acts by exciting a degree of irritation sufficient to produce absorption of the thickened texture, which occasions the contraction and induration concerned in the formation of stricture. To produce this, the instrument should be employed with the utmost possible gentleness, and should not be allowed to remain in the urethra more than one or two seconds."

This is, indeed, a harmless employment of the bougie; but is it a useful one? Is it, in fact, giving the instrument a fair opportunity of accomplishing all that it is capable of doing? I think not. Does the bougie, let me ask, always act as an irritant? If it indeed be so, it must be like blowing hot and cold with the same breath, for the effects of the bougie are frequently most soothing; in fact, allaying irritation in a remarkable degree. In cases of retention of urine, is not the mere pressure of the bougie against a stricture occasionally successful in relieving the patient? And when the point of the instrument can be made to penetrate the obstruction, if retained for a few minutes, the urine will, in general, most assuredly follow the removal of the dilating power. Are these effects to be regarded as simply those of an irritant? Surely there must be some other action of the bougie than that of "exciting irritation, and causing absorption of the thickened texture." Has not the mechanical dilating power of the instrument much to do in so quickly affording relief? If, however, the bougie be retained for one or two seconds only, then indeed it may possibly have no other action than that of a slight irritant.

There is scarcely, I believe, any other surgeon experienced in the treatment of stricture, who would not protest against such a frivolous use of the bougie. What were Mr. Hunter's views of this instrument? The following are his words:—"The cure by dilatation is, I imagine, principally mechanical when performed by bougies, the powers of which are, in general, those of a wedge. However, the ultimate effect of them is not always so simple as that of a wedge upon inanimate matter, for pressure produces

action of the animal powers, either to adapt the parts to their new position, or to recede by ulceration, which is not so readily effected."

When contrasting the freedom from fatal results of Mr. Syme's cases of perineal section in Edinburgh with the statistics of the same proceeding when had recourse to in London, the difference may probably be, in some degree, accounted for by patients bearing operations better in the more bracing air of the former than in the latter city, although even there, it appears one fatal case has occurred. (See the *Monthly Journal of Medical Science*, for March, 1851.) That other eminent Edinburgh surgeons regard Mr. Syme's operation in a very different light from himself, is evident from the lately published work upon Stricture by Professor Lizars, and from some "Remarks on the Treatment of Stricture of the Urethra by Perineal Incision," by Mr. Miller, Professor of Surgery in the University of Edinburgh, contained in the *Lancet*, March 22nd, 1851. From the latter it may be useful to quote the following statement:—"But fatal results have occurred, in other hands, both in London and Edinburgh. And it is not easy to see how a certain amount of risk can be avoided in such an operation. 1. By hæmorrhage: no doubt the safety here is to cut in the centre, and only in the condensed and solidified tissues which compose the stricture. 2. By urinary infiltration: and we know that very little of this may prove fatal, the urine acting as an intense poison on the system. 3. By abscess in or near the wound, leading perhaps to fistula, and irritative or hectic fever ensuing. 4. By intro-pelvic abscess. 5. By erysipelas. 6. By pyœmia."

In illustration of such risks, Professor Miller relates the following case of a gentleman attended by himself and Mr. Syme, perineal section having been performed by the latter, on the last day of January, 1850:—"After the operation, suppression of urine took place during twenty-four hours, along with unpleasant symptoms of shock. Fever set in, accompanied by pervigilium, and great general uneasiness. After forty-eight hours, the catheter was removed. On February 3rd, the constitutional disturbance became extreme, as indicated by violent sickness and vomiting, rigors, loss of voice, cold blue surface, feeble pulse, and recurrence of suppression of urine. After about twelve hours' continuance, these symptoms yielded to stimulants. Feb. 5th.—There was great uneasiness about the scrotum and perineum, and on the 7th an abscess had formed in front of the wound. This was opened,

and through the aperture urine as well as pus were discharged; the former continuing to pass through this wound as well as through the original one for many days. The greater part of the urine, however, came per urethrum, in a flat, yet free, stream, and without that peculiar distress to which the patient had previously been so long accustomed. When the wounds had nearly closed, a bougie was passed; but the effect was to reopen the wound, with increase of pain in the urethra. And in consequence, at the urgent solicitation of the patient, the bougie was refrained from till a more advanced period of the case. Feb. 22nd.—The urine had become very loaded and fetid, and continued to be of a depraved character for nearly a month. Up to this date, no appreciable sleep had been enjoyed; the patient never knew that he had slumbered, even in broken rest, for one moment; and he was reduced to skin and bone; and now began to feel great discomfort in lying on his right side. At the same time, intense pain recurred in the rectum after stools. These symptoms increased; and on the 15th of March, I detected a large abscess pointing in the rectum, about two inches from the anus, and mainly occupying the right side of the pelvis. This I immediately evacuated, with instant relief; and the patient, with the aid of morphia suppositories, was afterwards blest with the first genuine night's rest since the 30th of January. The abscess continued to discharge for about three weeks; and at the end of that time, the presence of matter could no longer be detected in the stools. On March 31, the wounds had been closed for fourteen consecutive days, and accordingly it was deemed safe to pass the bougie. Nos. 8 and 9 were insinuated with great gentleness; but next day the perineum was again inflamed, abscess formed, and once more the urine was discharged in front by the opening in the scrotum. From this date, however, the patient gradually recovered. He left Edinburgh for the south on the 18th May, with the perineum quite closed, and passing his urine in a very satisfactory way. In July he returned, to have a bougie passed; and a No. 9 entered without difficulty or evil result. The contraction of the urethra, however, was by no means permanently cured; and, accordingly, on the 9th of November, the regular use of bougies was commenced, with the view of securing final and full dilatation. At first, I passed No. 6 with difficulty, but No. 12 now enters without obstruction; and the patient himself having acquired the power of occasional introduction, his cure may be considered complete."

In a clinical lecture on Stricture of the Urethra and Perineal Section, by Professor Fergusson, published in the *Medical Times and Gazette*, March 13th, 1852, that gentleman, in his remarks on perineal section, observes :—"I myself have seen death result from it, and also danger of the worst possible description; and am so impressed with this, that I must beg of you to be very cautious before you resort to this so-called perineal section." Mr. Fergusson mentions the following case as being "one of the most satisfactory" he ever had :—"The gentleman was at first under the care of the late lamented Mr. Liston, who treated him by bougies with relief. At that surgeon's death he came under my care. His chief symptom then was a succession of aguish fits, which were most violent; and, in fact, the patient himself thought that he had a regular ague. However, I found that he had a very troublesome stricture. There was excessive irritability when an attempt was made to pass instruments, and it was followed by a severe attack of shivering. No benefit was derived by the attempts at dilatation, although I could pass a No. 3 or 4 catheter; and it appeared to me that the patient's constitutional suffering was entirely dependent on the state of his urethra. With a view of effecting a permanent cure, I proposed to him that I should cut his stricture, and relieve his ague at the same time. The operation was done; the patient had no bad symptom after it, and all his previous distress went away. This is now three years ago; within the last twelve months, however, some of his former bad symptoms have returned, in consequence of his having neglected to pass bougies; and he has lately been to town to have instruments passed, as the stricture had again contracted."

The hazards incurred by those who submit to Mr. Syme's proceeding, are accurately stated by Professor Miller. It is only within the last few months, that a gentleman, on whom the operation had been performed by a London surgeon, very narrowly escaped death, in consequence of the profuse and protracted hæmorrhage which occurred; whilst in another case, that of an hospital patient of Mr. Coulson's, on whom the same operation was resorted to, death ensued on the twelfth day after its performance, from phlebitis. In the account of the fatal case, which is described in a clinical lecture on Perineal Section, published in the *Lancet* for June 19th, 1852, amongst other particulars, we learn, that "on cutting into the corpus spongiosum penis, this structure exhibited purulent deposits, large, and dispersed abundantly throughout its

substance. The prostatic and vesical plexus of veins had evidently been the first part of the vascular system affected by the purulent contamination; for some of the component vessels were large, and contained half-coagulated blood; others had their coats thickened, were patulous, and had evidently held pus."

When it is recollected that the incision, in perineal section, is made through diseased tissues, and not, as in lithotomy, in healthy structures, the occasional occurrence of phlebitis or erysipelas cannot excite surprise; but how very rarely are such accidents the results of the latter!

It has now been sufficiently shown that all surgeons have not had the same good fortune as Mr. Syme in their operations for division of strictures by perineal section, when performed according to his method. The mischance which has occurred to others may soon happen to him. However skilfully perineal section may have been effected, who can insure his patient from the occurrence of erysipelas, or phlebitis? What degree of human care or foresight can so brace up the cords of life to the enduring point as always to guard against a fatal prostration? It may be that a patient has to submit to perineal section, whose vital powers have been so depressed by long suffering, that the loss of but a few ounces of blood may be sufficient to turn the scale against him. Surely it must be a strange perversion of reason, when gentlemen, well knowing the deplorable results of Mr. Syme's operation, continue to speak and write of it as being perfectly safe and satisfactory in its effects. With the late calamitous terminations of this operation, like beacon-lights to warn us of its dangers, I cannot but think that we are bound by every means in our power to relieve a stricture patient before having recourse to the knife.

There are some remarks of the late Mr. Aston Key, regarding operations, that we shall all do well to bear in mind. They occur in "Guy's Hospital Reports." When alluding to division of the prepuce in phymosis, Mr. Key observes:—"As the knife is at all times but an indifferent substitute for skill, and should ever be avoided if possible, the circumstances rendering it unnecessary are not beneath consideration." Taking these words for our text, let us endeavour to ascertain under what circumstances the surgeon may be justified in submitting a patient to perineal section; for there are, undoubtedly, cases, fortunately of rare occurrence, in which that operation will afford the only chance of relief; and

there are others, equally rare, in which it may, probably, be the most judicious proceeding.

In some strictures, from mechanical injury of the urethra, followed by more or less sloughing of the injured parts, a hard, gristly cicatrix may be left, while the greater portion of the urine is, probably, passed through fistulous orifices in the perineum. In such a case, dilatation and caustic may fail in the best hands, and division of the obstruction by perineal section be the only chance of relief for the patient. Where the urethra has been divided by a wound in the perineum, a hard cicatrix may be formed at the seat of injury, and the contraction cannot be kept sufficiently open by other means to insure the patient from danger, division by the knife may become advisable, although that proceeding will not always be successful; for so strong a tendency have cicatrices to contract, that although great care be taken, by constant introduction of instruments, to preserve the advantage which has been gained by the operation, yet the stricture may return nearly, if not quite, as bad as ever. In a case of hard, contractile stricture, not the result of mechanical injury, which has long remained impermeable to all milder means of treatment, and where the patient's general powers are suffering severely, the operation of perineal section may be advisable.

I have stated the above as instances in which perineal section may possibly be necessary; for, although the potassa fusa has succeeded in many such cases, who can calculate upon invariable success with any one method of treatment? I believe, however, with the exception of cases in which a portion of the urethra is obliterated after the sloughing of a part of the canal, or when a hard, contractile cicatrix is left, from complete division or laceration of the tube, that perineal section will rarely be necessary. With regard to Mr. Syme's operation, it is at present my conviction, that when an instrument, however small, can be passed into the bladder, the persevering application of caustic potash will accomplish more enduring good for the patient, if there be time for its operation, and life be placed in no immediate peril, than can be effected by perineal section, and without the slightest risk of a fatal occurrence. My reasons for such an assertion are, that I have lately, by the application of potassa fusa, succeeded in several cases when no hope had been held out to the patients but perineal section; and in two of them, both nitrate of silver and caustic

potash had been used, but the latter neither with that confidence nor perseverance requisite for its efficient action in such cases.

As a proof of what can be accomplished by dilatation, when properly and perseveringly employed, we have a striking instance mentioned by Sir B. Brodie in his valuable lectures on the "Diseases of the Urinary Organs." In that case the patient had a stricture which was surrounded by a mass of hard substance, that could be distinctly felt in the perineum, apparently from one inch to $1\frac{1}{2}$ in length. The stream of urine was of the smallest size. For many years before the patient applied to Sir B. Brodie, no instrument had been passed into the bladder. The method adopted in this case was firm pressure made by a solid silver sound, as described in a former part of this work. Sir Benjamin informs us that he at last succeeded in getting an instrument into the bladder, but not until he had persevered in the treatment for more than a year.

When retention of urine occurs in a patient who has long suffered from stricture, and it becomes necessary to relieve the bladder by an operation, division of the obstruction by perineal section may, under peculiar circumstances, be the proceeding which appears to offer the greatest advantages to the patient. If the stricture, for some length of time previous to the attack of retention, should have been impermeable to instruments, whilst the urethra and its contiguous tissues are thickened to a considerable extent, combined with fistulous openings, then it may be desirable for the patient to incur the risk of a free division of the obstruction by perineal section. If, on the contrary, retention should take place, and an operation become indispensable, when the stricture has previously to the time of the attack been permeable to the smallest instrument, or if impermeable, and there be no great extent of thickening of the perineal tissues, I should generally prefer relieving the patient, either by simply opening his urethra behind the obstruction, or by puncturing his bladder, and afterwards dilating the stricture. The former operation is undoubtedly to be preferred when the urethra is dilated behind the stricture, as the proceeding is then very simple.

Unless the urethra be dilated behind the stricture, I believe the operation of opening the membranous portion of the canal is a much more hazardous proceeding than that of puncturing the bladder. In a case of retention from stricture of forty years' duration, complicated with an enlarged prostate, I punctured the

bladder above the pubes, instead of having recourse to the more formidable operation of perineal section. Within a month from the time of the operation I could pass a No. 6 bougie into the bladder.

Several cases of retention from stricture have been recorded by Sir E. Home, in which he punctured the bladder by the rectum, and afterwards readily dilated the obstructions, which had previously been impermeable.

From all I have seen and read of division of strictures by perineal incision,—from my knowledge of the powers of potassa fusa in the removal of urethral obstructions, there are few cases of retention of urine from that disease, in which, were an operation indispensable, I should not prefer puncturing the bladder. Let me add, however, that this operation will very rarely be required in cases of retention, as most of them will yield to the free use of opium. It has fallen to my lot to have seen a great many cases of retention of urine, but in two instances only have I been compelled to puncture the bladder. When the effects of the caustic alkali in the cure of strictures become generally known, I venture to predict that their division by the knife, except when they are the result of mechanical injury, will not often be practised.

From Mr. Syme's position as a teacher, his strong recommendation of perineal section in strictures which do not readily yield to dilatation, appeared to me as being so likely to lead to fatal results in the hands of others, that I have considered it a duty to comment freely upon his views relative to the treatment of urethral obstructions. With regard to the somewhat startling assertion, "that there is really no impermeable stricture except from the awkwardness of the surgeon," I have only to observe, that cases of stricture occasionally occur in this metropolis, in which surgeons of the highest rank not unfrequently fail in their attempts to pass an instrument through the obstruction. In a hard gristly stricture, which has long been impervious to instruments, I can readily conceive it possible for Mr. Syme, with a very small grooved director or sound, gradually to find his way to the bladder, but it appears to me that such an instrument will be more likely to pass by the side of the obstruction, where there is least resistance, than through it. Daily experience convinces me more and more that perineal section is an operation that should never be performed whilst there remains a single chance of a successful result from less hazardous measures.

The above observations on perineal section have been written in no controversial spirit, but with an anxious desire to place fairly before the profession the various perils which have resulted from its performance. I have endeavoured conscientiously to discharge a public duty, by offering such remarks as appeared to me most likely to induce surgeons to reflect well before having recourse to that operation, either according to the method commonly adopted in impermeable, or that recommended by Mr. Syme in permeable, obstruction. Previous to the performance of an operation for the division of a stricture, whether permeable or impermeable, let me earnestly entreat every surgeon, in justice to his patient, first to give the potassa fusa a fair trial; when, if after due perseverance in its use, that remedy should fail, then, but not until then, in my opinion, will such an operation be justifiable. It is surely a good maxim in surgery, that when relief can equally be obtained by two methods, the one imperilling life, the other not, the safe means should always be chosen.

Let me not be misunderstood; for, although I have used my best endeavours to dissuade surgeons from having recourse to perineal section, except in the very few cases of stricture that cannot otherwise be more safely relieved, it has been far from my intention to say anything in disparagement of operative surgery, which, when ably and judiciously employed, amply merits, and will ever obtain, the admiration of all who can appreciate the untiring industry and high mental qualifications necessary to form an accomplished operator. By gentleness and perseverance, however, in the means which I have ventured to recommend in bad cases of stricture, the surgeon may rest assured he will generally be successful, without resorting to the knife. It is true that, in the unostentatious exercise of his art, he cannot hope to obtain that applause which the dexterous performance of an operation is sure to excite, yet his reward will be no less enviable, and far more lasting.

Since the preceding observations on perineal section were published, all I have since heard and seen of that operation has only the more strongly confirmed the views which I then expressed. Each passing year has, in fact, borne additional testimony of the fallaciousness of the promises which were held out to the public by Professor Syme, on his announcement of having discovered "a simple and easy mode of curing permanently the most difficult cases of urethral stricture, and unattended with danger to life."

At first it was asserted that the fatal occurrences after perineal section resulted from some error in the performance of the operation. Too many instances of fatality have, however, occurred from perineal section in the hands of first-rate operators, to render such an assertion any longer tenable, and it cannot now be rationally denied that the proceeding of Professor Syme, in the treatment of urethral stricture by external incision, is attended by danger. Sufficient proof of the occasional fatality of Professor Syme's operation of perineal section will be found recorded in the *Lancet* and *Medical Times and Gazette*. The cases of deaths from perineal section contained in these journals having been treated in public hospitals, their results have fortunately become known. When to these instances of fatality are added those which have occurred in private practice, we may form a tolerably correct estimate of the amount of danger incurred by the performance of perineal section.

Can this operation be regarded as a permanent cure for urethral stricture?

The answer is, most assuredly not. In my own practice, I have had quite sufficient evidence to convince me that it has no such pretension. In several instances in which strictures had been divided by external incision, according to Mr. Syme's method, and the patients afterwards came under my care, I have had considerable difficulty in getting the smallest sound through the tissues which had been divided. In some cases, I have been assured by the patients that their condition was worse than before the operation. The effect of some of the operations of perineal section which have come under his observation, has been aptly described by Professor Lizars, as "the conversion of a simple into a traumatic stricture." Most of the patients whom I have seen after having submitted to perineal section have certainly voided their urine better for some months after its performance; but in the course of a year or two, sometimes more, sometimes less, their former difficulty of micturition has returned, the occasional introduction of instruments having proved totally inefficient in counteracting the strong tendency to recontraction of the divided tissues. In one case the strictures had been twice divided on a grooved staff, and by a surgeon whose operative skill, I believe, Professor Syme would be the last person to question. In that case I had very great difficulty in getting a No. 1 silver sound through the strictures which had been incised. I was assured that recontraction had occurred, notwithstanding every effort for

its prevention by the use of the bougie, which latterly could not be passed. In some instances, the wound made in the operation has never quite healed. The advocates of perineal section will doubtless object to the preceding statement, as being founded principally upon the more unfortunate results of the operation; justly observing, that it is only by contrasting them with the successful cases, that a right judgment of its merits can be formed. My object, however, has been to show that, instead of being a safe and efficient mode of curing the worst forms of stricture, its results have afforded ample proof both of its inefficiency and occasional fatality.

It is but fair to state that in most of the patients who have applied to me after the performance of perineal section, the operation was resorted to for the division of long, hard, and tough strictures, involving the spongy structure of the canal. When perineal section has been adopted for the relief of the valvular, or thin circular obstructions, I can readily imagine that its results may have proved satisfactory. In the more obstinate forms of stricture, in which the spongy structure of the urethral canal has become much condensed, I have good reason to believe there will always be more or less difficulty in preserving sufficiently open the aperture made by the knife. In such cases it will be no easy matter to carry out the intentions of Reybard after complete division of the urethral parieties at the seat of obstruction by his urethrotome, which, to use his own words, are "to prevent the reunion of the edges of the wound, to cause them to cicatrize separately, and obtain in the interval which results from their separation, a cicatrix thin, supple, and wide."

The remarkable freedom from fatality following perineal sections performed by Professor Syme, when contrasted with its results in the hands of other eminent surgeons, has excited no slight degree of surprise. In the Second Edition of Professor Syme's work on "Stricture of the Urethra, and Fistula in Perineo," published in 1855, he observes, "I have now performed the operation (perineal section) 108 times, with only two fatal results that can be ascribed to it." It is to be hoped that Mr. Syme has since been equally fortunate in his operation.

The *Lancet* of Nov. 28th, 1854, contains the following judicious clinical observations by Mr. Lee on the subject of perineal section. Mr. Lee thinks "the liability to extravasation of urine forms the grand distinction as to this operation being admissible or not." Mr. Lee considers, "that from Mr. Syme's description of his opera-

tion, in which he says he divides only the skin, superficial fascia, and the urethra, it is evident the strictures upon which Mr. Syme has operated have been situated anterior to the membranous portion of the urethra; for that, had he operated upon any stricture even in the anterior part of the membranous portion of the urethra, Mr. Syme must have been in danger of wounding the deep perineal fascia, as well as the superficial." Mr. Lee thinks, "that from hence arises a great practical distinction of the utmost importance. When a stricture is situated in the bulb of the urethra, it may be divided from without, and any urine which escapes from the passage is sure to pass out at the external wound. But it is different when the knife in passing along the grooved director or sound perforates the deep perineal fascia, and wounds the urethra as it passes through this part. The urine which escapes from the passage may then lodge in the wound made in the deep perineal fascia, and a drop or two may become infiltrated behind this dense structure. It will then give rise to inflammation, and having no means of escape, will produce violent constitutional irritation. When once inflammation is established in the cellular tissue of this part, its products will permeate the areolar tissue, and may thus propagate the inflammation to the outside of the bladder, and to the cellular tissue within the pelvis, thus giving rise to abscesses and purulent infiltration."

In the second edition of Professor Syme's work on Stricture, from which I have previously quoted, are the following observations relating to the seat of stricture:—"If strictures existed in the prostatic or membranous portion of the canal, extensive incisions involving the deep fascia of the perineum would be requisite. But the fact is, that the seat of contraction is never so far back, and may be positively limited to that portion of the urethra which extends from the bulb to the orifice. The ground upon which I make this statement is, that in all my experience I never found it necessary to cut further back than the bulbous portion for the conveyance of a full-sized instrument into the bladder." In the division of strictures at the junction of the membranous and bulbous portion of the urethra, there must, I should think, be some danger of wounding the deep perineal fascia, and consequently of extravasation of urine. That such was the result in one instance, will be seen in the case which I have previously quoted from the "Remarks on the Treatment of Stricture of the Urethra by Perineal Incision," by Professor Miller.

Perineal section, as practised by Mr. Syme, we are informed by Civiale, had been long since adopted by some of the French surgeons; and by Tolet, so far back as nearly two centuries.

Long before Mr. Syme's adoption of perineal section, Sir B. Brodie recommended the same operation in traumatic stricture, when the contraction would not yield to ordinary dilatation. Sir B. Brodie observes, "that in such cases a small staff is to be introduced into the bladder, and the cicatrix of the urethra divided from the perineum, a gum-catheter being introduced afterwards and allowed to remain until the wound is healed over it."

An interesting historical account of perineal section will be found in Civiale's valuable "Traité sur les Maladies de l'Urèthre," in which it appears, that not only was Mr. Syme's operation of perineal section practised long ago, but also with the same object—that of the cure of the stricture—as the following passages from Civiale's work will show:—

"This operation (Syme's) has been represented as a modern invention, its claims being especially supported—1st, Upon the differences which it is supposed are remarked between Mr. Syme's method of proceeding and that of the ancients; 2nd, With regard to the special end which the operator proposes to attain. In both these points of view there is evidently a mistake."

"The citations which I have previously made, leave not the least doubt on the first point. One is even struck with the resemblance which exists between the proceeding adopted by Tolet nearly two centuries ago, and that proposed by Mr. Syme in the present day as a new method.

"After the preliminary measures of the operation, Tolet says:* —'To be more assured of the course to take in making the incision, a grooved sound is introduced into the urethra and passed upward into the bladder without force.

"'An assistant holds the sound, or the surgeon himself holds it, and acts in all circumstances as in lithotomy (*comme à la taille*), making the incision not so far down as for lithotomy, and less long on the grooved sound. The groove should be continued as a gutter, without there being anything to arrest it at the point of the sound.'"

"Mr. Syme introduces a grooved conductor through the stricture without employing force, and without producing any serious flow

* "Traité de l'Opération de la Taille," 4th edition, p. 202.

of blood. The conductor is held by the operator, or confided to an assistant. An incision, about four centimètres in length, is made in the median line of the perineum. Like Tolet, he passes the sound without force, and it is on the groove of the conductor that he divides the tissues.

"Like Tolet, he divides the perineum in a less extent; he cuts from before backwards, or from behind forwards, as did Petit, Ledran, and others.

"Finally, Tolet distinguishes, and with the same care as Mr. Syme, urethrotomy practised upon a conductor and that which is done without a guide; and to which he had recourse only in cases where it was absolutely necessary to operate for the prolongation of life, just the same as Mr. Syme proposes.

"We see, then, that the contemporaries, and especially the successors of Tolet, in practising the *boutonnière*, under the different circumstances which presented themselves, have left us very little to do with regard to the distinction of cases, and to the modifications in the operative proceeding which the special conditions of the malady may render necessary. Nothing essential has been changed of that which was in use in the seventeenth century: the expressions and the manner of presenting the facts have alone varied.

"In the operation which Colot practised on the 25th of June, 1687, in consequence of a swelling and an induration of the perineum, that surgeon made the incision much longer, but divided the process into two parts: in the first, he divided the superficial tissues, without reaching the urethra; and he completed the operation by dividing the canal sufficiently at the diseased part. Is not that what the Edinburgh surgeon does, and what I myself have done? To sum up, all the few changes which have been introduced in our days in the proceedings of the ancients bear only upon the form, or on secondary points; and do not destroy in the main the identity of the operation of Tolet and that of Mr. Syme.

"2nd. Under this head, that of the end to be obtained, the pretensions to invention are not better founded than they are under the first. The ancients, in dividing the urethra by the perineum, it is said, had only in view the relief of the retention of the urine, and not the cure of urethral strictures, whilst the new proceeding is exclusively designed to subdue the latter obstructions. Messrs. Syme, Thompson, and Sédillot have especially insisted on this

point, and on this difference in the object of the operation they have boldly laid claim to an actual discovery.

"If they would only take the trouble to read with attention the authors whose opinions they have thus interpreted, they would see that they have been completely mistaken with regard to the end, the nature, and the bearing of that which Mr. Syme calls the old operation. 'The groove of the *trois*-quart serves me,' says Petit, 'to conduct my bistoury sufficiently forward so as to cut entirely the part of the canal which was strictured;' and he adds, 'All those upon whom I have practised the *boutonnière* have recovered the freedom of the canal when the obstruction was included in the incision.'

"Ledran glides his bistoury from behind forwards in the urethra, to meet the groove of the catheter, pushed through the meatus as far as the obstruction; the course of the urine was thus restored.

"Dessault blames the proceeding which consists in opening the urethra behind the stricture, because it leaves intact the contracted parts of the canal, and would render it necessary to resort to dilatation.

"With regard to the authors who have not expressed themselves so plainly, have they acted in any other manner? And have they only had in view, as it is pretended in the present day, merely the relief of the retention of urine, and not the removal of the obstructions of the canal, which were its cause?

"Now those, who from the example of Tolet, of Colot, of Delpèche, and others, have made the perineal incision on a conductor previously introduced into the bladder, as does Mr. Syme, have not had to contend with retention of urine, since it did not exist; and if required, they could have introduced a catheter to draw off that fluid.

"In all these cases, the *boutonnière* had, and could have, for its aim the destruction only of the obstacles in the canal, as is done in the present day.

"Whenever there existed a fistula in the perineum, giving passage to the urine, the principal end of urethrotomy cannot be the object of a doubt; it is evident to all the world, that the operators wished solely to destroy the strictures."

"In seeking to restrict, as they do, the aim and bearing of the old operation, the modern school appears to have forgotten, that the ancients used indifferently the words retention, suppression of urine, callosities, obstruction, carnosities of the urethra, to desig-

nate the same disease, and that the term suppression, particularly employed to indicate the impossibility of micturating, was only more generally used because it expressed the most striking symptom of urethral stricture. Besides, at that time but little importance was attached to the choice of terms. We have seen that the same operation is successively designated by the words, *la boutonnière* and *ponction*, &c.; but the vagueness of the expressions cannot destroy the reality of things; and the facts which I have just cited can admit of no misinterpretation. I do not fear to repeat, that our predecessors did use the *boutonnière* more than two centuries ago, which the Edinburgh surgeon proposed to do in 1844."*

In these additional observations on perineal section, I have endeavoured faithfully to communicate the results of my subsequent experience of that proceeding, being most desirous that its true nature should be thoroughly understood, as I feel more than ever confident that it is an operation too serious to be lightly adopted: and that, with rare exceptions, whenever an instrument can be passed into the bladder, relief can be equally obtained without hazard by other means.

CASES IN WHICH THE OPERATION OF PERINEAL SECTION PROVED FATAL, WHEN PERFORMED ACCORDING TO MR. SYME'S METHOD IN PERMEABLE URETHRAL STRICTURES.

In the *Lancet* of June 29th, 1850, is recorded the case of a man, fifty years of age, upon whom perineal section, performed by Mr. Cock, proved fatal. The particulars of this case I have previously stated.

The *Lancet* for June 19th, 1852, contains the description of a fatal case of perineal section which occurred in Mr. Coulson's practice.

In the *Lancet* of November 25th, 1854, is recorded the following case:—"The patient, who was about twenty-six years of age, had suffered much from stricture, complicated with fistulous openings and tracks. Mr. Fergusson introduced a silver catheter, of about No. 4 size, which glided easily into the bladder. Mr. Fergusson then made the usual incisions, exactly along the raphé of the perineum, and having reached the instrument, carried the

* Opus cit.

knife upwards and downwards for about the distance of one inch and a half. The urethra having thus been fairly laid open, the scalpel was carried along the fistulous tracks, which were all largely incised. The silver catheter was withdrawn, and an elastic one of a large size introduced. This patient subsequently died of purulent deposit."

In the *Lancet* of February 21st, 1857, is recorded the following case:—"The patient was an elderly man. The strictures existed at the anterior part of the urethra, and also behind the scrotum; and were exceedingly tight, having resisted the ordinary treatment. The man was under the care of Mr. Curling, at the London Hospital. The disease had existed for some years. Both of these strictures were divided by Mr. Curling upon a grooved director, as directed by Professor Syme, and an instrument passed into the bladder. It is stated that the operation was a very protracted one, and was one of the most difficult cases of stricture which Mr. Curling ever had to treat. Unfortunately extensive peritonitis set in, which carried off the patient in seven days. The kidneys were found much diseased, one weighing three ounces, the other much less."

The *Medical Times* of February 16th, 1850, contains the following particulars of a fatal case of perineal section:—"Mr. Henry Smith, at the Medical Society of London, related the case of a young man who had had an irritable stricture for several years. He was a patient at King's College Hospital. A small grooved staff having been passed into the bladder, the stricture was divided upon it, and a catheter afterwards introduced and retained. The man went on pretty well for some days, when bad symptoms set in, which rapidly took a low form, and he died within a fortnight after the operation, with all the symptoms of irritable fever. At the post-mortem examination, no extravasation of urine, nor any inflammation within the pelvis, was found, and the bladder was perfectly healthy."

In the *Medical Times* of May 18th, 1850, the following case is recorded by Mr. H. Smith:—"The patient had laboured under a tough and irritable stricture for ten years; but with this exception, he was healthy in every respect. In consequence of the irritability of the stricture, and its disposition to contract, it was thought advisable by his surgeon to resort to perineal section. A No. 6 grooved staff was first passed into the bladder, and the incision was made through the perineum upon the groove, and the whole of the

stricture divided. A large gum-catheter was introduced and then retained. For five or six days the case went on pretty satisfactorily, at the end of which period he became feverish, vomited occasionally, suffered from dyspepsia, and cough; and all the signs of intense irritative fever set in, and the patient died within a fortnight of the operation. On post-mortem examination nothing was found to account for his death."

In the *Medical Times* for January, 1851, a fatal case of perineal section is recorded by the operator, Mr. Mackenzie, of Edinburgh. The age of the patient is not mentioned. It is stated that the greater part of the bulb, and a stricture of considerable extent anterior to the scrotum, were divided in the median line. The patient died on the eighth day after the performance of the operation.

In the *Medical Times and Gazette* of January 12th, 1856, is recorded a fatal case of perineal section. The operator was Mr. Cock. The age of the patient twenty-three years. A small grooved staff having been passed through a very tight stricture, it was completely divided, and a full-sized catheter passed and retained. It is stated that the man did fairly for some days; but subsequently an abscess formed in the back, and all the symptoms of pyæmia supervened, and death took place on the eighteenth day. No autopsy was permitted.

In the *Medical Times and Gazette* of April 5th, 1856, is recorded the following case:—"A worn-out feeble man, aged sixty-seven, under the care of Mr. Birkett, in Guy's, on account of numerous fistulæ in the perineum and scrotum. He had suffered from disease of the urethra for six years. There was no difficulty in passing an instrument into the bladder. With a view to cure the fistulæ, perineal section of the bulbous part of the urethra was performed on a grooved staff. Some blood was lost, but not very much. In the evening sickness came on, he sunk into collapse, and died ten hours from the operation. The autopsy showed fatty degeneration of most tissues, but there was no acute organic disease."

The *Medical Times and Gazette* of April 4th, 1857, contains the record of a fatal case of perineal section. The patient was under the care of Mr. Hey, at the Leeds Infirmary. "A man, aged sixty-two, had suffered from a tight stricture more than twenty years. Perineal section on a grooved staff was performed. A day or two afterwards secondary hæmorrhage occurred, and after this the

wound became sloughy from infiltration of urine. He eventually sunk, and died about seven weeks after the operation. Both kidneys were found small, firm, and puckered."

In the *Medical Times and Gazette* of July 4th, 1857, the following case is recorded:—"The patient, a man aged forty-four, in feeble health, for many years the subject of intractable stricture. Perineal section was performed by Mr. Fergusson upon a catheter. A catheter was afterwards retained. All did well for the first fortnight, when symptoms of cystitis supervened, and the man sunk into a state of great exhaustion. Death occurred on the twenty-first day. The wound had not healed, and the stricture was already recontracting."

The *Medical Times and Gazette* of October 31st, 1857, contains the record of a fatal case of perineal section which occurred at the London University College Hospital. The operation was performed by Mr. Quain. "A man, aged thirty-three, was in poor health, and for three years the subject of stricture. There were no fistulæ. A grooved staff was introduced, and perineal section after the usual method was performed. Hæmorrhage succeeded the operation, and he died on the morning following."

The *Medical Times and Gazette* of June 5th, 1858, contains the following account of a fatal case of perineal section, performed by Mr. Bickersteth, at the Liverpool Royal Infirmary. The patient was a waiter, aged 27. Perineal section was performed on a grooved staff, and a No. 8 catheter, afterwards retained for forty-eight hours. A few days after the operation an attack of jaundice, with bilious vomiting, occurred. At this time the urine passed freely; but in the following week the patient complained of severe pain about the bladder, and was unable to pass his water. Catheters were now passed, but no urine could be obtained. In the belief that the bladder was distended by blood-clot, the patient was put under chloroform, a grooved staff introduced, and the opening in the urethra enlarged. The finger could now be passed into the bladder, as also a catheter, but still no urine came. On gentle pressure being made on the distended bladder, a large mass of blood-clot was ejected, and about three pints of urine followed. Arterial blood was now observed to be flowing freely from the deepest part of the wound. With some difficulty the vessel was secured on a tenaculum, and a lithotomy tube was afterwards retained in the bladder. The patient sank into a feeble state, and death took

place on the second day. At the autopsy the liver and both kidneys were found diseased.

In the *Medical Times and Gazette* of July 3rd, 1858, is recorded the following case. The Liverpool Royal Hospital. Mr. Bickersteth.—"A healthy man, aged 44, applied for the relief of a stricture, which had resulted from a blow on the perineum some time previously. Perineal section was performed on a grooved staff, and a catheter afterwards retained in the bladder. Peritonitis followed, and death ensued on the third day. No autopsy."

In the *Medical Times and Gazette* of August 21st, 1858, there is a communication from Mr. Henry Smith, in which he mentions three instances in which perineal section had, within a very short time, proved fatal.

CHAPTER XII.

SURGICAL FEVERS.

It will have been seen, that most of the patients in whom perineal section proved fatal, died of pyæmia, or purulent infection. That this fatality was owing to no fault in the mode of performing the operation is evident, from the well-known dexterity of the operators. An inquiry, therefore, regarding the cause of these not unfrequent instances of post-operative fatality cannot but prove interesting to every practical surgeon.

That the occasional sudden and unforeseen occurrence of pyæmia, or purulent infection, from surgical operations, was well known to the late Mr. Guthrie, is shown by the observations relating to that subject which I have quoted in the chapter on "Internal Division of Strictures."

It was my intention to have made some remarks upon this disease, but the subject of "Surgical Fever" has lately been treated in such a masterly manner by Professor Simpson, whose rare genius throws light upon whatever engages his attention, that any additional remarks of mine would be superfluous.

Two of Dr. Simpson's patients having died after comparatively trivial operations, in some clinical remarks to his pupils, he observes, "These two cases present very striking examples of operations, apparently of the most safe and simple nature, failing and ending fatally." Dr. Simpson then enters on the discussion of the question, What do patients die of after undergoing surgical operations, either in the course of general or obstetric surgery?

"CAUSES OF DEATH AFTER SURGICAL OPERATIONS AND INJURIES.

"In entering upon this discussion, I would take leave first of all to observe, that the inquiry as to what patients die of after surgical operations, is a question which has not hitherto

attracted that degree of attention from surgeons themselves which its paramount importance imperatively demands. In vindication of the members of my own department of the Profession, I would remind you that there is not a text-book on Midwifery in which there is not one lengthy chapter devoted to the consideration of puerperal fever, the common cause of death in obstetrical patients; and there are besides many monographs and bulky treatises in which it is discussed fully and in all its bearings. On the other hand, there is hardly a large work on surgery in which you will find a word stated as to the cause of the mortality of patients who have been subjected to surgical operations. We have one large standard German work on surgery translated into English, which is very complete and exhaustive on most surgical topics; but on looking at it this morning to see what the author or translator had to say about the causes of deaths after operations, I found not a word on the subject; and in one of the most recent, and perhaps the best English work on surgery—a bulky tome of some thousand or more pages in length—this all-important question is dismissed in the short space of one half-page. In other text-books and systems of surgery we have not even so much as this half-page. Faithful to their designation and their original vocation, chirurgeons have, with some great and brilliant exceptions, gone on trying to improve the merely manual part of their profession—what some have spoken of as the cutlery and carpentry of Surgery only, without attending sufficiently to some of its most important pathological relations; and especially without showing any anxiety to inquire as to the pathological effects of their operative procedures upon the bodies of their patients. Indeed, some surgeons seem to loose all interest in their patients from the time that they are carried off the operating-table, and eschew rather than otherwise their treatment, if they are attacked with surgical fever. Our books and manuals devoted to operative surgery, elaborately describe various, and sometimes many modes and methods by which almost every individual operation may be performed, and they learnedly discuss the site, length, depth, shape, form, &c., of the incisions required, while they seem all agreed to leave unheeded and uninvestigated the fact that patients die in startling numbers after every operation, and after each and every form and variety of incision, of whatever length and depth, and however and wherever made."

After giving tables of the mortality of amputation of the

thigh, of the ligature of arteries and herniotomy, Dr. Simpson observes:—

"These tables will suffice to show you, that the mortality after the severer kinds of surgical operations is something frightful and enormous. At the same time, confessedly, the chances of a fatal issue, after even the slightest operations, are by no means few. And the question comes to be, What do these patients die of?

"First of all let us inquire, Do they die of purely surgical complications? In a few cases they do, but not in many. In Guy's Hospital 'Reports for 1843,' Dr. Chevers has published an 'Inquiry into the Causes of Death after Injuries and Surgical Operations,' which is one of the best memoirs on the subject we yet possess, and written by a physician, not a surgeon. In this memoir Dr. Chevers gives an account of the post-mortem appearances found in the bodies of one hundred and fifty-three patients, many of whom 'had undergone severe operations, or suffered from extensive accidental injuries,' while 'others had been the subjects of wounds or contusions of an apparently very trivial kind.' Of these 153 patients only nineteen, or one in every eight, died of tetanus, sloughing, hæmorrhage, suppuration, and other immediate and purely surgical complications.

"Secondly, if thus only so very small a proportion, therefore, of surgical patients die of fatal surgical complications, what do the great mass of them die of? They perish, showing symptoms of acute fever during life, and showing on examination after death, in various internal organs, the products of acute and recent inflammation. They die of surgical fever, a disease consisting of a combination of co-existing acute fever, and acute internal inflammations; just as puerperal patients die of puerperal fever, a similar compound disease, consisting, exactly like surgical fever, of co-existing acute fever, and acute internal inflammations. Of Dr. Chevers's 153 surgical patients, 134 died of surgical fever, and presented after death recent acute inflammatory effusions and lesions in various internal organs. The relative frequency with which different internal organs and parts of the body were found attacked with acute inflammation in these 134 cases, is shown in a condensed form in the following table:—

"Inflammatory Lesions in 134 Cases of Surgical Fever (From Chevers).

Peritonitis was observed in	52	cases.
Enteritis (excluding cases of Hernia) ..	9	,,
Pneumonia and its results	47	,,

Pleuritis	35 cases.
Bronchitis, Laryngitis, and Diphtheritis ..	4 „
Pericarditis	14 „
Arteritis and Aortitis	4 „
Phlebitis	3 „
Meningitis	27 „
Cerebritis	9 „
Cystitis	8 „
Pus in muscles or joints	3 „
Inflammation of Tunica Vaginalis	1 „

"When in Vienna last summer, my nephew, Dr. Alexander Simpson, obtained access to the pathological records of the large General Hospital there, where the autopsies are made under the supervision of Professor Rokitansky, and drew up for me from these reports some statistical tables to show the relative frequency with which the various organs and parts of the body become the seat of secondary inflammatory changes in the cases of patients dying of surgical and of puerperal fever respectively. Allow me to call your attention now to this.

"TABLE, SHOWING THE RELATIVE FREQUENCY WITH WHICH DIFFERENT ORGANS AND PARTS OF THE BODY WERE FOUND TO HAVE UNDERGONE RECENT INFLAMMATORY CHANGES IN 100 CASES OF SURGICAL FEVER.

The lungs and pleura in	69 cases.
Veins	53 „
Seat of the operation or injury	40 „
Cellular tissue and muscles	28 „
Peritoneum	16 „
Brain and its membranes	16 „
Bones and joints	15 „
Spleen	10 „
Kidneys..	9 „
Stomach and Bowels	7 „
Bladder	6 „
Liver	5 „
Pericardium	4 „
Lymphatics	3 „
Arteries..	2 „
Vagina	2 „
Interior of uterus	1 „
Heart substance	1 „
Parotid gland	1 „
Ear	1 „

"The patients in whom inflammatory lesions of these various internal organs and parts were discovered after death, had been subjected to operations and injuries of all parts of the body, and of all degrees of severity, from amputation of the thigh down to

the operation for phymosis, and the simplest, most superficial wounds.

"Consider now that table of the organs and tissues most commonly affected by inflammation in cases of surgical fever with this."

Dr. Simpson gives a table, showing the relative frequency with which different organs and parts of the body were found to have undergone recent inflammatory changes in 500 cases of puerperal fever; and observes, that a companion of these two tables will serve to show that surgical and puerperal fever are analogous in their nature. Dr. Simpson then inquires—

"WHAT IS THE NATURE OF THE MALADY WHICH ACCOMPANIES OR GIVES RISE TO THESE SECONDARY LESIONS?

"We have seen that every patient who is placed upon an operating table runs no small risk of death; and that when the operation is severe, the patient is in as great, or indeed greater, danger than a soldier entering one of the bloodiest and most fatal battle-fields. We have seen, also, that while a few of these patients die of the immediate surgical consequences and complications of the operation itself, the vast majority of them are carried off by a febro-inflammatory malady, resulting, indeed, from the operation, but proving fatal from the morbid changes which it produces in different, and sometimes distant parts of the body. In this surgical fever, as in puerperal fever, you have a constitutional fever, accompanied by the development of local acute inflammatory disease, confined often to organs and parts lying in the vicinity of the site of the primary injury, but in many cases diffused over other more remote organs and textures. This fever may be of three kinds, or rather, it manifests itself in three different kinds of cases.

"1. *Fever from Local Inflammation.*—Fever may be a symptomatic result, first of all, of a very intense degree of inflammation set up in the seat of the operation or injury; but in such cases it rarely leads to a fatal issue. For, unless the patient be very much reduced in strength, or altogether in a very bad habit of body, the inflammation excited in any injured part can but seldom be of such a high degree of intensity as to prove fatal of itself. This may also occur in such exceptional cases, as you have an instance of in the second of the patients whose history I have given you, and who died in consequence of the inflammation set up in an evacuated

ovarian cyst. There the inflammation was spread over all the interior of an enormous cavity, and proved fatal, just as inflammations of such an extensive surface as that of the peritoneum do, viz., by gradual depression of the action of the heart.

"2. *Fever, with Inflammation extending to neighbouring parts.*—Fever in surgical patients is much more frequently found to arise from, or at least to be associated with, inflammation not confined merely to the seat of the injury, but spreading thence to other parts and organs, either from continuity of texture, or contiguity of position. In almost every instance of this kind, the nearest lymphatic glands are more or less hyperæmic and hypertrophied, for the morbific agent seems in them to have a tendency to spread along the lymphatic system of vessels, and to excite in them a high degree of inflammation.

"3. *Fever, with disseminated centres of Inflammation.*—In a third, and by far the most extensive class of cases of surgical fever, the inflammatory lesions and manifestations are not confined to the seat of the injury, or to the textures in its vicinity, but are found situated in different and distant organs and parts of the body. Of all internal organs the lungs are those which are the most liable to become the seat of those secondary or metastatic inflammations; and when a careful examination of such cases is made, there is almost always to be detected some morbid condition of the veins in the neighbourhood of the original wound.

"Now, in the case of patients dying of fever consequent on surgical operations or injuries, you will find, as I have already stated, that very few indeed die of the fever attendant on inflammation confined to the wounded part; and that in the vast majority of cases, the fever is found to have been complicated by the occurrence of inflammatory changes in other parts,—sometimes near the seat of the injury, but sometimes more remote; and it is of this latter class of cases that I wish at present more particularly to speak, under the designation of Surgical Fever. How is it, then, that surgical patients are so apt to die of this form of fever? In olden times, surgeons would have been content to believe that the fever resulted from inflammation set up in the site of the wound, or from sympathetic inflammations, as they were called, in other parts. But this idea has been given up since it was found that there was no proportionate degree of intensity between the amount of fever and the amount of inflammation at the site of the surgical wound. A very high degree of inflammation may rise, for

instance, in the stump of an amputated limb, and pass on to suppuration and ulceration, while the patient presents but few or no symptoms of surgical fever: and on the other hand, fever may set in and prove fatal in cases where the wound appears to be the seat of no higher degree of inflammation than is necessary to produce adhesion of the opposed raw surfaces. There is not of necessity, either in surgical or in puerperal fever, any relation of intensity between the local lesion and the constitutional malady, and there is no surgeon or pathologist, so far as I know, who now seeks to find in the former the only cause of the latter; for all are rather inclined to the belief that they are both effects of one common cause, that cause being some toxic or diseased condition of the circulating fluids. In small-pox, measles, dothenenteritis, and some other natural fevers, if I may be allowed to call them so, where likewise a constitutional fever and local inflammations are found associated together, we no longer believe that these, viz., the general fever and the local inflammations, stand to each other simply in the relation of cause and effect. Doubtless the fever may be aggravated by the severity of the local lesions, but they are both in the first instance excited and engendered by some morbid material circulating in the blood; they are both due, in each particular case, to some peculiar form of toxæmia. They do not stand to each other in the relation of cause and effect, but are both the effects of one common cause—the special toxæmic state of the blood. And in surgical patients, too, the blood may become poisoned and perverted in its nature; and it now remains for us to inquire by what means the blood becomes altered, or what are the changes which it undergoes, and which excite in the patient such a fatal fever and so many local lesions."

Dr. Simpson goes on to treat of the œtiology of the disease, and divides the causes which produce it into—first, predisposing; and second, exciting.

The effects of septic matters absorbed from the wound, and pus absorbed into the blood-vessels, are elaborately and most ably discussed.

Dr. Simpson's observations on the semiology of the disease I shall quote at length:—

"Such being the different modes in which the secondary lesions are produced, the question next occurs—How are we to recognise the onset of an attack of surgical fever? And to enable you to answer this question for yourselves, I must point out to

you, shortly, the most common and constant symptoms of the disease.

"1. *Rigors.*—The patient whose history I first read to you had, as you must have observed, a rigor about thirty or forty hours after the time of the operation. Now, whatever may be the physiological explanation of this phenomenon,—and many explanations have been given, which it were more curious than practically interesting to dwell upon,—a shivering fit of greater or less intensity, and of longer or shorter duration, is common to all the various forms of surgical fever, and is the first, and one of the most common symptoms of the occurrence of the disease. You must not expect, however, to find every attack of surgical fever ushered in by rigors; for in some cases it would appear as if they never occurred at all, and in others they are so slight as to be readily overlooked. But still the occurrence of a rigor in a patient who has been subjected to any operation, should at all times make you alive to the probability of an attack of fever, and then the next point to be attended to is,

"2. *Acceleration of the Pulse.—Respiration.*—For next to the rigor the rapid rise of the pulse is the most common indication of the onset of the disease; and is its most constant and most pathognomic phenomenon throughout its course. Every medical man who is told that a surgical patient has had a shivering fit, at once puts his finger on the patient's pulse, to ascertain whether it be in any degree accelerated. If he find that it is up, and beating from 100 to 120 strokes in the minute, or oftener, he knows at once that some mischief is going on; and, generally speaking, the case is dangerous according to the degree of exaltation of the pulse. In some cases it runs up early to even 130, 140, or more. It is generally more weak as well as more rapid than usual. The occurrence of a rigor, and sudden and marked acceleration of the pulse, are, then, the two most constant indications of the occurrence of surgical fever. Dyspnœa and accelerated laborious respiration often come on in the course of the disease, and are always most unfavourable phenomena. The other symptoms are all subject to much variation, and depend on the,

"3. *State of the Tongue, Skin, &c.*—Most practitioners will look at the tongue to see in what state it is; but it varies so much in different patients affected with this disease, and is so liable to be affected according to the predominance of some of the minor lesions or morbid conditions, that we cannot regard any particular

condition of the organ as characteristic of surgical fever. When glazed and dry, it presents itself to us in its worst aspect, and continued moisture and softness of the tongue in any case make us always more hopeful of our patient's recovery. The colour and condition of the skin are likewise variable. In some cases it becomes moist, and is covered with a perspiration, which you might suppose to be critical and beneficial, but which in reality is not so. When suffused with such perspiration, the surface is usually cold; in other cases it is sometimes cold to the touch, sometimes burningly hot. Not unfrequently the skin takes on an unusual dingy yellowish tint, or becomes leaden-coloured or icteric. As regards the nervous symptoms, you will find that there is usually great depression from the first; and in some cases low muttering delirium sets in early, and is always to be looked on as a very unfavourable symptom. Sickness and vomiting are very common occurrences, especially where the primary lesion is in any of the abdominal organs, and was seen in both of the cases in our ward. Diarrhœa is a frequent complication. These symptoms of surgical fever, I repeat, are all subject to the greatest variations, but in no case will you find a slow and steady pulse.

"SIGNS OF THE SECONDARY LESIONS.

"The secondary, or metastatic inflammations, are not usually so intense in character as to lead to the development of any very marked symptoms. They are often masked and merged in the general phenomena, and may be altogether overlooked. Nor is their detection in every case a matter of vital importance. The supervention of inflammation in any organ will usually be indicated by some derangement in its functional activity. Thus, if the lungs have become affected, the patient will most likely have slight cough and expectoration, and will complain of stitches in the side; but this is not necessarily the case; and great effusions may occur into the pleural cavity, for instance, without the production of any marked symptoms. Auscultation and percussion would, of course, serve to detect such a condition; but the patient is often too weak to allow of our subjecting him to the ordeal."

The treatment is discussed in the same masterly manner as the preceding parts of the subject, under the following heads:—

1. The preventive or prophylactic treatment, which includes observations upon:

1. Date of operating.
2. Preparation by previous restraint.
3. Antecedent dieting.
4. Prophylactic medications.
5. Purer air—of country, of home, &c.
6. Particular seasons, &c., preferable.
7. Communication by contagious inoculation.

2. The curative treatment of surgical fever is divided by Dr. Simpson into local and constitutional measures. The first is subdivided into—

"1. Local measures at the seat of the primary wound; and 2. Local antiphlogistic measures at the seats of the secondary inflammations."

I shall quote the commencement of Professor Simpson's remarks on the "constitutional curative measures:"—

"B. CONSTITUTIONAL MEASURES.

"For only one type of fevers, viz. intermittent fevers, have we aught to wield in the way of a specific; for to their poisonous influence, as you know, quinine and arsenic are almost as certain as any that we have in toxicology. On the other hand, against surgical forms of fever, medicine has, as yet, at least, nothing whatever that is specific to offer. Most or all of these fevers have a tendency to run through a determinate and definite course; and if we can keep our patient alive, and without any mortal damage amidst the internal machinery of the body, till that course is terminated, his life is preserved. To attain this fortunate end, we have generally a number of secondary indications to follow. Let me attempt to point out to you briefly what these indications chiefly are in the special case of surgical fever."

"FIRST INDICATION.

"*To obtund and reduce the Irritability of the Nervous System.*—Perhaps opium, in some form or another, is the drug that, on the whole, is most frequently used in the treatment of surgical, and its analogous disease — puerperal fever. It is especially had recourse to whenever any of the concurrent secondary local inflammations are particularly severe, and give rise to much pain and distress. Under these circumstances, there is sometimes almost

apparently a tolerance of this remedy; and then it seems to act as a general supporter and stimulant, while by obtunding the nervous system it saves the patient from the depressing and dangerous effects which mere local pain produces upon a febrile patient. Even when there are few marked symptoms of local inflammation in the disease, if the patient bears opium well, and without sickness and vomiting, he may be kept under its influence for days in a passive and vegetating state, if we may so express it, while the disease runs through its course and comes at last to a favourable end. When given in surgical or puerperal fever, opium should be exhibited, not in large doses, every twelve or twenty-four hours only, but in repetitions of small doses every few hours, so as to maintain a steady narcotic action."

"SECOND INDICATION.

"*To subdue the Excitement of the Heart and Vascular System.*—This indication looks far too mechanical in its principles, though it is a well-known fact that great excess of rapidity in the movements of any machine is always dangerous, as being liable to damage and ultimately break down its mechanism. As, however, the over-excitement of the heart and vascular system in surgical fever principally results from the irritation of the morbid materials contained within the blood itself, the indication I allude to might be, perhaps, most correctly referred to our next head, viz., the artificial elimination of these morbid materials from the circulating system. But I speak of it as a separate indication, because in reality various medicines have been proposed and used with the view of reducing the rapidity of the pulse, some of which are eliminatory in their action, and others not."

Dr. Simpson makes some brief observations on the effects of the various remedies which have been most frequently employed to fulfil the "second indication," viz., colchicum, digitalis, aconite, the veratrum viride, the veratrum album, and chloroform.

"THIRD INDICATION.

"*To depurate the Blood.*—This, doubtlessly, would be by far the most important indication of all, if we had the means of fulfilling it with anything approaching to perfect certainty and accuracy. As it is, we constantly try to accomplish this indication in practice in

surgical and in other fevers, and by a variety of means and channels. There are various channels in the economy by which superfluous and deleterious matters are thrown off from the blood. Some may be thrown off by the skin by the use of diaphoretics, or excreted through the intestinal canal and chylopoietic viscera by purgatives and mercurials. Perhaps a combined antimonial and ipecacuanha emetic is one of the most powerful depurants, and most powerful alteratives, too, which can be employed in the earliest stages of febrile action. Occasionally it will prevent or cut short an attack of continued fever, for instance; and in some varieties and types of puerperal fever it seems to act most beneficially. After a surgical operation leaving a large wound, many would fear giving an emetic lest the consequent retching and succussion of the body would too much disturb the wounded part; but the same objection does not hold good in reference to rigor and other commencing symptoms of surgical fever following any of the minor forms of surgical operation."

Some further useful observations are made under this head by Dr. Simpson.

"FOURTH INDICATION.

"*To sustain the Vital Powers of the Patient by Stimulants, etc.*—As surgical fever advances to its height, this always becomes a most clamant and important indication. Sometimes, under apparently the most desperate circumstances, the steady and methodic use of stimulants will enable you to pull your patient through. You are not utterly to lose hope of doing so in almost any case, unless, what too often happens, the stomach becomes so irritable as to reject all sustenance in this way. This irritability may be sometimes cured, and still more frequently prevented, by the free and frequent swallowing of small pieces of ice—a drug not entered in the pages of the Pharmacopœia, but one more useful in reducing febrile action than the thousand medicines that are to be found in our apothecaries' shops. Be assured, also, that by far the best and most manageable form of stimulant is wine or brandy; and do not run the risk of upsetting the patient's stomach and losing your last chances of saving him, by having recourse to lengthy medicated mixtures and prescriptions as stimulants. If you add any form of nutritive material to the stimulant, let it be of the simplest kind, as the whites or albumen of three or four eggs beat up in half a tumbler

of cold water; which at once makes a nutritive and by no means disagreeable drink."

For further information upon the pathology and treatment of "surgical fever," I must refer my readers to the valuable clinical lectures from which the preceding observations have been taken, which are published in the *Medical Times and Gazette*, commencing with the number of that journal of April 23rd, and ending with that of May 21st.

CHAPTER XIII.

TREATMENT OF THE DIFFERENT KINDS OF STRICTURE.

Dilatable Stricture.—This stricture seldom offers any difficulty in its management; a few introductions of the bougie being all that is generally required for its removal. Either the plaster bougie or sound may be used, whichever gives least pain to the patient. If the urethra should possess but little irritability, the bougie or sound may be passed every second or third day, the size of the instrument being gradually increased. A dilatable stricture is often rapidly cured; five or six introductions of the bougie being sometimes sufficient for the restoration of the strictured portion of the urethra to its healthy size. To guard, however, against a relapse, it will be prudent to pass a full-sized bougie once a week for some little time, and then at intervals of a month. As a general rule, applicable to all kinds of stricture, it may be as well at once to state, that, except in cases of retention of urine, whenever the introduction of instruments causes much irritation, their use should be discontinued until such irritation be relieved. This form of stricture commonly requires but little medical treatment. If, however, from the introduction of instruments, or other causes, the stricture becomes irritable or inflamed, it may be necessary to have recourse to the remedies usually employed for the relief of urethral irritation.

Simple Chronic Stricture.—The degree of difficulty in curing a stricture of this kind will depend principally upon the nature of the obstruction. If the mucous and submucous tissues only of the urethra are thickened, the disease will more readily yield than when either the fibrous structure of the canal is affected, or the cells of the corpus spongiosum have become condensed by effused lymph. Commonly in proportion to the hardness and extent of a stricture, will be the difficulty of its removal. An old, firmly

contracted, extensive fibro-cartilaginous stricture will be the most difficult of all to cure, it being usually very slow in yielding to the bougie, and remarkably prone to return if the use of the instrument be omitted. Strictures, as well as most other local diseases, are often much influenced by the state of the constitution.

From the preceding observations the conclusion naturally follows, that upon various contingent circumstances will depend the length of time required for the cure of a stricture, and that it is impossible to form an accurate opinion upon the subject merely from the size of the instrument which can be passed into the bladder. Especial care should always be taken that, from a too anxious desire to dilate a stricture, we do not do more harm than good by causing irritation; which error every surgeon, much accustomed to the management of that disease, must have occasionally committed.

The object of the surgical treatment is, of course, to restore the contracted portion of the urethra to its healthy calibre, which is usually effected by the introduction of dilating instruments. In many cases the introduction of instruments may be advantageously repeated every second or third day; but should irritation ensue, their use must be discontinued until its cessation. If, however, the irritation continue, so as to prevent, for some length of time, the further dilatation of the stricture, two or three applications of potassa fusa will often be found the most efficient means for its relief. When a stricture is predisposed to irritation, if the patient's avocations will not permit him to rest during the day, the bougie or sound should be passed in the evening. In cases where the contraction is so great as to admit only a very small instrument, it will be best to use a silver catheter; and if a No. 2 or 3 can be got into the bladder, it may sometimes be retained for twenty or thirty hours with advantage, should no irritation of consequence follow.

The bougie-catheter, which is much commended by Mr. Harrison, is likely to be useful in many cases. It is described by that gentleman as "forming a hollow cylinder for the extent of eleven inches, at which point there is an eyelet; the extremity beyond is solid and tapering. It may be described as a short conical bougie affixed to a catheter. The instrument is about thirteen inches in length. It possesses many advantages over either instrument singly. It may be introduced merely into the stricture, and retained there without incommoding the prostatic part of the

urethra; and should there be any sudden call to void the urine, it can be gently passed on into the bladder, and, after it has served the purpose of a catheter, be again restored to its former position." (*Vide* "The Pathology and Treatment of Stricture of the Urethra." By J. Harrison, F.R.C.S. 2nd Edition, 1858.)

Great care must be taken in the introduction of very small silver catheters. Extremely gentle pressure only should be used until the point of the instrument has entered the stricture, which will be known by its being grasped; and when increasing the pressure, it is easy to ascertain if it be in the right direction by attempting slightly to withdraw the catheter, which is sure to be tightly held if in the contracted portion of the urethra. This precaution is especially necessary, for the stricture being usually much the hardest part of the urethra, a degree of pressure, which can be safely used when the instrument has fairly entered the obstruction, might act injuriously upon other parts of the canal. The attempt to pass the catheter onwards should be persevered in from ten to twenty minutes, if necessary, bearing in mind that an obstruction may be gradually dilated without injury, when, by a more sudden effort, the urethra would most probably be torn. If the lining membrane of the urethra should be lacerated, an occurrence which is generally very easily detected, it will be proper to withdraw the instrument, and leave the canal undisturbed for a few days, so that the laceration may have time to heal before another attempt be made to dilate the stricture.

It has been previously stated that it is always desirable strictures should be dilated to the full size of the healthy urethra, and when, from the effects of former ulcers, or from malformation, the urethral orifice is contracted, it should be enlarged downwards with a straight bistoury. Care must be taken that the incision does not unite; and for that purpose a short piece of bougie should be kept fixed in the urethra for a few days, withdrawing it, of course, during micturition. Although desirable to dilate a stricture to the full size of the healthy urethra, it is not prudent to do so in all cases. In some firm strictures which had long existed, I have observed that when sufficiently dilated to admit a No. 8 or 9 bougie, all attempts at further dilatation did more harm than good, by invariably causing so much irritation as to increase the contraction for a time, and without any subsequent good effects. Under such circumstances, all that is necessary to be done is to keep the stricture as open as possible, by desiring the patient to

pass for himself, or to have passed for him, as large a bougie as can be used without irritation, once a week or fortnight, as may be necessary. Should, however, any tendency to recontraction beyond this point occur, a few gentle applications of potassa fusa will usually be all that is required.

The following interesting case, mentioned by Mr. Guthrie, is a good illustration of this kind of stricture:—"A gentleman came under my care, with stricture five inches from the orifice of the urethra, through which a solid silver bougie could not be passed, although a similar sized soft one could, and this peculiarity remained until his death, which took place last year. Whenever the canal contracted a little, a solid bougie would not pass; whenever it was dilated, so as to admit a No. 10, it would then pass, although not so easily. This gentleman died of apoplexy, having been in the habit of passing a bougie twice a month, or oftener, and of showing himself to me every year or two years, and I had the opportunity of examining the urethra. For the extent of an inch the canal was altered in colour and appearance, being yellower and rougher than the remaining part, and the wall a little thickened generally, but there was no particular thickening at any one part, so that the disease, in all probability, arose from inflammation attacking the urethra for the extent of an inch, and giving rise to a similar alteration for the same distance. The sensation communicated on passing a bougie was that of its going over a rough hardened surface for some extent, and the dissection proved the fact."—*Opus cit.*

Such cases are, however, exceptions to the general rule; for the instances are, I believe, but very few in which, by a judicious use of the caustic alkali, strictures cannot be dilated to the full size of the healthy urethra. If, from the introduction of instruments, or from indiscretion in the patient, irritation of the stricture ensue, the treatment previously described for its relief should be adopted.

During the whole of the treatment, it will be proper to have the bowels kept gently open by that kind of aperient which best agrees with the patient. The urine should be frequently tested, and, if necessary, such remedies must be employed as are best calculated to restore it to a healthy state. Exercise on horseback should be avoided in all cases of stricture, except very slight ones; and even then, it is better dispensed with. Moderate walking, or

riding in a carriage, will, however, be found beneficial in improving the general health. Exposure to cold damp weather should be avoided as much as possible; and during the winter, as well as the greater part of spring and autumn, the patient should wear thick flannel next his skin; changing it for a lighter kind of that material during the summer months. These precautions may appear trivial; but should a stricture be much contracted, irritable, or inflamed, by keeping the surface of the body warm, an attack of retention of urine will frequently be prevented.

Impermeable Stricture.—Is there such a thing as an impermeable stricture? According to Professor Syme, there is not, the impermeability existing solely, as he asserts, from "the surgeon's awkwardness, or failure in the introduction of instruments, there being no truly impermeable stricture."

The proposition of Professor Syme is, that whenever the urine can pass through a stricture, it is also permeable by an instrument.

I need scarcely observe that the terms impermeable and impassable, when applied to strictures, relate exclusively to instruments; as it is seldom, however considerable may be the urethral obstruction, that the urine will not be able to find a passage through. Obliteration of the urethra is an entirely different matter.

If, however, there be no stricture which is impassable by instruments in the hands of Mr. Syme, that some of the ablest surgeons have not attained his remarkable dexterity is evident from their remarks upon the subject.

The late Mr. Guthrie, in the work which I have previously cited, observes that "a stricture is said to be impassable when an instrument cannot be passed through it, although there is still a sufficient channel open for the evacuation of the urine, which trickles through it." I have previously quoted a case described by Sir B. Brodie, in which a stricture remained impassable to instruments in the hands of that eminent surgeon for more than a year.

Leroy d'Etiolles, in his work "Des Angusties ou Rétrécissements de l'Urèthre," &c., has the following passage:—"Notwithstanding the blind confidence of surgeons who recognise no impermeable urethral obstruction, and who say that wherever the urine passes sounds or bougies ought to find a passage, it is nevertheless true, that there are strictures which do not admit the passage of any instrument, but which permit the urine to trickle through them.

These are mostly cases where the thickening is irregular, and the passage of a zigzag character."

It would be easy to swell the list of surgeons of the highest eminence who have acknowledged the impermeability of strictures in their hands.

It may be useful to quote some of Mr. Fergusson's observations, which may tend to throw light upon the subject under discussion. I should be tempted to quote these observations were it only for their remarkable and praiseworthy honesty, but as an exposition of the opinions upon so delicate a question as the impermeability of stricture by probably the most dexterous operator of his day, they are more especially valuable.

These observations will be found in the *Lancet* of Nov. 18th, 1854, and are as follows:—"On this subject Mr. Fergusson many years ago made the following remarks in the Theatre of King's College Hospital, after having performed Mr. Syme's operation. The question about impermeable stricture is an idle one, for there is certainly no impassable stricture for the surgeon who is determined *to force through it.* It is unfortunate that eminent teachers should claim more dexterity than they really possess, for by their full acquaintance with the anatomy of the part, they in some degree, by a sleight of hand, appear to pass the instrument easily into the bladder, whilst they are really *forcing* their way through a canal, the relative anatomy of which is very familiar to them. He (Mr. Fergusson) had long had the idea that the seeming dexterity was nothing but actual violence. In the present instance (a case of external perineal incision of the urethra) he had thought it right to force the passage, and introduce the director, and he might, if so disposed, have told the pupils that he had succeeded in his endeavours by dint of perseverance and dexterity."

Taking it then for granted that cases of impermeable stricture do exist, I shall proceed to the discussion of the treatment of

Impassable Stricture.—The great object in this, as in other strictures, should be, of course, to restore the urethra, as nearly as possible, to its healthy integrity. The accomplishment of this desirable object will, however, require, in many cases, no inconsiderable degree of skill and judgment in the surgeon; for, unless great gentleness and caution be used in attempting the introduction of instruments, so much irritation may be excited in a stricture as to render it equally impervious to the urine as to the bougie. When a patient applies

for relief with a stricture which, on examination, is found to be impermeable to instruments, although permitting the urine to trickle through it, before attempting a second time to pass a catheter or bougie, such remedial measures should be adopted as are best calculated to allay urethral irritation. After having waited for a few days, I generally try to introduce a small silver catheter; but if it will not enter the stricture, I endeavour to introduce the smallest sized bougie. If unsuccessful, after gentle and persevering efforts to get an instrument into the bladder, I then have recourse to the application of potassa fusa, which, as before stated, has proved to me a most valuable remedy in such cases.

Generally, after a few applications of potassa fusa to an impervious stricture, a No. 2 or 3 silver catheter can be passed through it; and if there be no second stricture, or disease of the prostate, the instrument will pass on into the bladder. If the armed bougie should pass through the stricture, it must be instantly withdrawn, and replaced by another which is unarmed. Should there have been much difficulty in getting an instrument into the bladder, it should be retained, if practicable, for several hours, or for a day or two, when but little irritation is caused by its retention.

Each day's experience convinces me more and more, that nothing good is to be gained by employing so much force as to tear through the obstruction; for, besides its liability to cause retention of urine, the necessary healing process will retard the cure of the disease. So convinced am I of the propriety of proceeding with extreme gentleness in these cases, that I prefer using the potassa fusa a few extra times, to incurring the risk of tearing the stricture by premature efforts to pass an instrument through it.

Although the greatest difficulty will have been surmounted when an instrument has been passed into the bladder without violence to the stricture, yet the remainder of the treatment will not always prove entirely free from difficulties. It is very easy to talk of gradually increasing the size of the instrument on each successive introduction, but not always so easy to be accomplished; for it often happens, that, after having at one time succeeded in passing a No. 4, on the very next attempt to introduce the bougie, it will be impossible to get a No. 3, or, possibly, one of the smallest size, even to enter the stricture. However gently an instrument may be passed through a highly contracted stricture, from the irritation which is sometimes unavoidable, congestion or inflamma-

tion of the lining membrane will follow, so as, for some little time, to render fruitless any attempt to penetrate the stricture without doing mischief. Under these circumstances, two or three mild applications of potassa fusa, by relieving inflammation or congestion, will often produce the very best effects.

The difficulty in dilating a stricture, although depending greatly on its extent and hardness, will be much increased by its irritability and predisposition to inflammation. The stricture, if hard and extensive, and especially if particularly irritable, must be very cautiously dilated. In some cases, the transition from the introduction of an instrument to that of the next size higher in the scale, will often produce so much irritation as for a short time to increase the contraction. It will be found very useful, as before remarked, to have bougies, sounds, and catheters, made of intermediate sizes of the common scale of the instrument-makers, as the gradation, according to that scale, is sometimes greater than a stricture will bear without irritation. The common effect of over-distension of a stricture is inflammation, with a muco-purulent discharge, often mixed with blood. The inflammation sometimes extends along the ejaculatory ducts to one or both testes. Retention of urine is also very likely to ensue from too much stretching a stricture.

After having, with the aid of potassa fusa, succeeded in getting an instrument into the bladder, there may be no further necessity for the use of that remedy, unless the stricture become irritable, or but little progress be made in its dilatation, when the potash may be re-applied with great advantage. The introduction of a bougie sometimes causes irritation external to the urethra, and subsequently abscess; if so, the canal should be left undisturbed by any instrument until an outlet be given to the matter, either by art or nature, unless retention of urine render the introduction of the catheter necessary for the patient's immediate relief.

If it be thought desirable to take a cast of the face of a stricture before using the potassa fusa, this can be done by the introduction of a model bougie. Care must be taken that an enlargement of the prostate gland be not mistaken for a stricture. I have known such a mistake occasionally to occur, when, after ineffectual endeavours to pass a small bougie beyond seven or eight inches, a full-sized prostate catheter has been readily introduced into the bladder. As stricture may be complicated with enlargement of

the prostate, the state of that gland in persons advanced in life should, as far as possible, be ascertained.

It is in the impassable stricture that attacks of retention of urine are most to be feared; consequently, every precaution should be taken to prevent their occurrence. As these attacks usually result from an accession of inflammation or congestion of the lining membrane of the stricture, every means must be adopted for their prevention. The treatment required, should retention occur, will be found described in its proper place.

A method sometimes adopted by Sir B. Brodie, in the treatment of impermeable strictures, has been previously described.

Irritable Stricture.—The surgical treatment of this stricture must be conducted with very great gentleness, or the patient will be but little benefited. In many cases of irritable stricture, the potassa fusa will be found very serviceable, as three or four applications of the caustic will commonly diminish, if not entirely remove, the irritability. An irritable stricture often bleeds on the introduction of a bougie, but this hæmorrhagic disposition seldom continues after a few mild applications of potassa fusa. Any stricture, although not naturally irritable, may become so, either from constitutional disturbance, an unhealthy state of the urine, or from want of judgment in the use of instruments. It not unfrequently happens, that after having succeeded to a certain extent in dilating an old gristly stricture, which kind of obstruction is not usually very irritable, that no further progress can be made; for, when attempting to increase the size of the dilating instrument, so much irritation follows, as for some little time to increase the contraction. In such a case, a few applications of potassa fusa will generally enable the surgeon to go on with the dilatation. If, notwithstanding the application of the caustic, the stricture continues too irritable to permit further dilatation, then it will be best entirely to desist for some little time from the use of instruments, and to employ the general measures recommended for allaying urethral irritation. It is probable that after a few weeks' rest, the stricture will yield to the gentle use of the bougie, assisted by occasional mild applications of potassa fusa.

It is in irritable strictures that rigors are most likely to occur soon after the introduction of instruments; and it is in such cases that Sir B. Brodie has recommended the retention of the gum-catheter, which, by preventing the urine from passing over the

irritated lining membrane of the stricture, has put a stop to their recurrence. In many such cases, however, I have eventually succeeded in dilating the strictures by an occasional application of potassa fusa, by prolonging the intervals between the introduction of instruments, and by employing such general remedies as most effectually relieve urethral irritability and inflammation.

From what has been previously observed, it can readily be imagined that the treatment of irritable strictures requires the greatest degree of patience, judgment, and forbearance on the part of the surgeon. Great advantage is derived from the administration of opium. Much good will often be effected by giving the patient five grains of Dover's powder, ten of powdered gum-arabic, and ten of sesquicarbonate of soda, in a little barley-water, twice or thrice daily, unless the urine be alkaline, when the soda should be omitted. Leeches applied to the perineum are sometimes useful; but I seldom now have recourse to them, having found an occasional application of potassa fusa, in most instances, much more efficient, and not debilitating to the patient. As this kind of stricture frequently occurs in persons whose general health is impaired, more especially from residence in warm climates, such measures should be adopted as are best calculated to improve the state of the patient's constitution. Vegetable acids, salted meat, or highly seasoned food of any kind, as being too stimulating to the urinary organs, should be avoided by persons with irritable strictures.

In many cases, suppositories, containing from one to three grains of opium, or opiate enemata, composed of from forty to sixty drops of tincture of opium, in two or three ounces of warm gruel, are exceedingly useful. The same precautions as previously recommended should be taken to guard against cold or vicissitudes of temperature. In persons predisposed to rigors, the administration of an opiate just before, or soon after, the introduction of an instrument, will often prevent their occurrence. If there be no disposition to retention of urine, and the nervous system of the patient be much depressed, from twenty to thirty drops of tincture of opium in a little warm brandy and water, will be the best mode of giving the opiate. The administration of quinine with diluted sulphuric acid, in some warm aromatic water, is often useful in removing the irritability of constitution favourable to the occurrence of rigors. If the quinine fail, small doses of the liquor potassæ arsenitis may succeed, or a combination of the two

remedies. Of all the means, however, whether local or constitutional, we can employ for preventing the occurrence of rigors after the introduction of instruments, I am fully satisfied that there are none so effectual as a few gentle applications of potassa fusa.

An irritable stricture may very probably be advantageously dilated to a certain extent; but, should any further dilatation be attempted, so much irritation will ensue, that more harm than good will result. This is one form of stricture for which Professor Syme recommends external section as a cure. As the irritable condition of the urethra commonly depends upon a faulty constitution, which mere division of the obstruction cannot alter, but little permanent good is likely to result from the operation.

Inflammatory Stricture.—In this stricture no surgical interference with the urethra is proper, unless retention of urine should occur. Even then, however, many surgeons, from a fear of increasing inflammation, strongly object to the use of the catheter, and prefer having recourse to every other means of relief before attempting its introduction. I believe that no such fear need be entertained, for the constant straining of the patient, as well as the spasmodic contraction of the bladder, will do much more harm than the contact of an instrument with the inflamed urethral membrane; besides, the immediate relief which invariably ensues, if a catheter can be got into the bladder, most satisfactorily establishes the propriety of the practice.

As being the least likely to cause irritation, a small gum-catheter, without its stylet, is the best instrument to use, and should therefore first be tried. The abstraction of blood from the perineum, either by leeches or by cupping, is a very essential part of the treatment, the whole of which should be strictly antiphlogistic, aided by rest in the horizontal position. The patient should be desired to drink freely of barley-water; and proper doses of Dover's powder, soda, and gum-arabic, administered every third or fourth hour, will generally afford great relief. Warm fomentations to the perineum, or the warm hip-bath, are usually productive of much comfort.

Stricture with marked disposition to contraction.—In the management of this form of stricture, which may be called the contractile or the elastic, I have seen great benefit produced by the occasional application of potassa fusa. When the stricture has been fully dilated, the patient should be particularly cautioned as to the necessity of his continuing the regular introduction of the bougie. If

irritation or inflammation occur during the dilatation, they must be combated by the means previously recommended; and it is scarcely necessary to observe, that attention should be paid to the state of the patient's general health during the whole course of the treatment.

Spasmodic Stricture.—The surgical management of this stricture should be very similar to that of the irritable, the latter being remarkably predisposed to spasm. When introducing instruments in strictures subject to spasm, they should be lightly and quickly passed down to the obstruction, which, if thus taken by surprise, will often yield; whereas, by a more slow proceeding, the bougie would very probably either not enter the stricture, or, if it did, might be then so firmly grasped as to prevent its further advance. I have found the potassa fusa very useful in diminishing the tendency to spasm, as well as relieving it when present; a few gentle applications of the remedy once or twice a week having been often attended with signal advantage. I have, in fact, found that the caustic potash has proved by far the best antispasmodic.

Opium is a most valuable remedy in this kind of stricture, and may often be given with great advantage, not only by the stomach, but in the form of suppository or enema. The warm bath, hot fomentations frequently applied to the perineum, with the occasional application of leeches to the same part, the free administration of opium, or other narcotic, combined with ipecacuanha and camphor, at bed-time, followed by a gentle aperient in the morning, and the general regimen not too stimulating, comprise the principal means to be relied upon in the medical treatment. In no stricture is attention to the state of the urine more necessary than in this. I have previously observed that a purely spasmodic stricture of the urethra, according to my experience, except from irritation of the neighbouring parts, is not of very common occurrence. That in most spasmodic strictures the lining membrane at the seat of disease will be found morbidly sensitive. It is in such cases that the potassa fusa has been so beneficial. In a purely spasmodic stricture, instruments should be introduced only from their indispensable necessity for the relief of retention of urine. The treatment in such a case must, of course, be directed to the removal of the cause of the spasm, whatever that may be.

Stricture from laceration, or other mechanical injury of the Urethra.—The common causes of this injury have been previously stated, and that it is often productive of strictures of the most unyielding

character. The symptoms are, in general, sufficiently well marked to attract attention to the mischief that has occurred. If, soon after the reception of an injury in the perineal region, blood be discharged from the urethra, there can be little doubt of the nature of the accident, especially if there be also difficulty or inability to void the urine. Should the urethra be merely bruised, without laceration, there will be freedom from hæmorrhage, as well as from the severe scalding sensation experienced during micturition, when the urine passes over the lacerated part.

In severe mechanical injuries of the urethra, there is always more or less difficulty of micturition, if not complete retention. When the mischief has arisen from force applied externally, there will be usually a sense of tension in the perineum, with some tumefaction, as well as a red or purple colour of the skin, extending possibly to the scrotum and penis. The urethra may, however, be severely injured from without, and the integuments of the perineum maintain their natural appearance.

In a case of lacerated urethra, if there be no external opening, or the opening, should such exist, be small, prompt measures must be adopted for the prevention of extravasation of urine; or for mitigating its effects, should the misfortune already have occurred. The more extensive the urethral laceration, the greater will be the chance of mischief from urinary infiltration. The danger more immediately to be feared from lacerated urethra is that of infiltration of urine, the occurrence of which must, if possible, be prevented. If there be a free external wound communicating with the urethra, the greater part of the urine will pass through the opening, and urinary infiltration need not then be dreaded. A full-sized catheter should, if possible, be passed into the bladder, and there retained. If, however, a large catheter cannot be introduced, or should there be reason to suppose that urine has become extravasated, a free external incision should be made in the mesial line of the perineum, so as to give exit to the extravasated blood and urine. A catheter should then be passed along the natural passage into the bladder, where it should be retained until the external wound is healed. This is the practice that was recommended by Mr. Liston, and the only efficient one as regards the safety of the patient. The introduction of a staff as far as the seat of injury, previous to the perineal incision, will serve as a guide to the knife. If extravasation of urine should have occurred when the patient is first seen by the surgeon; in addition to the

perineal opening, free incisions should be made in all the parts into which the urine has penetrated.

In the late Mr. Liston's work on "Operative Surgery," the following passage occurs:—"After complete division of the urethra, the anterior part has sometimes, through carelessness or inattention (the patient is generally more to blame than the practitioner), been permitted to close, and the urine has thus continued to be discharged entirely through a false passage. I have more than once had occasion to remedy such an inconvenient state of a patient, by cutting down in the perineum upon the canal, and carrying a catheter onwards from the orifice into the bladder. The instrument is passed down to the obstructed part, an incision is carried from over its point, directly in the line of the raphé, and through the track of the fistula; the urethra is thus opened, and the catheter passed without difficulty."

I shall conclude this subject by the following valuable remarks by Sir B. Brodie:—"In all cases in which there is reason to believe that the urethra has been divided or lacerated, in consequence of an injury inflicted on the perineum, it is the duty of the surgeon not only to look at the great and immediate danger, but to guard against future ill consequences; and much may be done, in the first instance, towards preventing mischief, from which it would be very difficult to relieve the patient afterwards. If there be a penetrating wound, in which the urethra is probably implicated, an elastic gum catheter should be introduced with the least possible delay, and allowed to remain in the bladder until the healing of the wound is far advanced, or, at all events, until it has been ascertained that the urethra has not suffered; the catheter being, however, occasionally removed for a limited time, if it seems to act as a cause of irritation.

"In cases of contusion of the perineum, without an external wound, when an effusion of blood in the perineum or scrotum, or any other circumstances, lead to the suspicion that the urethra has been injured, the same treatment should be had recourse to. The gum catheter should be introduced as soon as possible, and allowed to remain for at least some days after the occurrence of the accident. The extravasation of blood does not in itself justify the making an incision in the perineum; and, indeed, according to my experience, there can be no worse practice than that of making an incision in a case of simple ecchymosis, either under those or under any other circumstances. But, as where such extravasation exists,

there is always reason to apprehend that there may be further mischief, the progress of the case should be carefully watched, and on the first appearance of any symptoms indicating that urine has escaped into the cellular membrane, or that abscess is forming, a staff should be introduced into the urethra instead of the gum catheter, and a free incision should be made from the perineum into it, the gum catheter being replaced afterwards."

Stricture from ulceration of the External Urethral Orifice.—When the urethral orifice is contracted from the cicatrization of an ulcer, relief may be obtained by the regular introduction of a short bougie or silver tube, which, in some cases, is necessary every time micturition is required. In instances where the whole orifice of the glans has been destroyed by ulceration, there is such a tendency to continued contraction in the cicatrix, that, if neglected, complete retention of urine may occur, and the only effectual means for its relief is division of the contracted part by the knife. In such a case a gum catheter should be kept in the bladder until the wound has healed. Experience, however, proves that even after this operation, the cicatrix still retains its contractile tendency; and to prevent a return of the contraction, Sir B. Brodie advises that "a bougie, about two inches long, should be introduced into the urethra every morning, and allowed to remain there for five or ten minutes."

In two cases of stricture at the urethral orifice, under Mr. Teale's care at the Leeds Infirmary, that gentleman "adopted the plan of cutting the stricture freely through in the median line below. The skin and the mucous membrane were then stitched together on each side. The parts healed well, and a permanent oblique opening of good size was secured. In one case the age of the man was fifty-three; in the other, twenty." I can speak from experience of the satisfactory results of this method, having adopted it with success in cases in which a less complete division of the indurated tissues had previously failed.

To prevent the possibility of any misunderstanding upon a very essential part of the treatment of urethral stricture, I shall conclude this part of my subject by enforcing the necessity in every case of stricture, but especially in its more aggravated forms, of attending to the state of the urine, which should be frequently tested, and kept as healthy as possible. The late Dr. Golding Bird's practical work on "Urinary Deposits," contains all the information which can be required for a proper examination of the urine.

COMPLICATIONS OF STRICTURE,

EITHER

ACCIDENTAL,

THE RESULT OF THE DISEASE ITSELF,

OR OF

THE TREATMENT EMPLOYED FOR ITS RELIEF.

CHAPTER XIV.

RETENTION OF URINE.

Of all the effects of urethral stricture, this, when prolonged, is the most painful. It is scarcely possible to imagine the state of intense suffering arising from an over-distended bladder, with complete inability to discharge its contents. In extreme cases the sufferer is restless and excited, traversing his room in a state of the utmost distress, until compelled, by a recurrence of the violent contractions of the vesical and abdominal muscles, to seize convulsively, or to lean against, the nearest object for support, his straining attempts to micturate only adding to his almost unendurable agony. The penis is often in a state of painful congestion.

There are few conditions in which more urgent and clamorous appeals for relief are addressed to the surgeon, on whose self-possession, skill, and judgment in using with discretion the resources of his art, often depends, humanly speaking, the salvation of the patient.

What, then, is to be done for the relief of the sufferer? That is the all-important question to be solved. It is almost needless to remark, that before any efficient means for the relief of the patient can be rationally adopted, the cause of his suffering must, as far as possible, be ascertained.

There can be little doubt that retention of urine in cases of stricture, in a very large majority of instances, results from spasmodic action of the urethral muscles at, or just beyond, the seat of disease, a fact which sufficiently accounts for retention, occurring much more frequently in obstructions at the bulbous, than in the anterior, portions of the canal. When retention happens from stricture within the first five inches of the urethra, it is mostly caused by inflammation, congestion, or, perhaps, mere irritability of the diseased tissues, converting a partial into a complete obstruction.

Let it be taken for granted that it is retention of the first kind with which the surgeon has to deal. The history of the case is likely to afford useful information as to the manner in which the patient had passed his water previous to his present attack. If the passage of the urine had been for some length of time effected with difficulty, and in a small stream, a mistake will not often be committed in attributing the retention to a narrow stricture, aggravated by spasmodic action of the urethral muscles, caused most probably by some injudicious indulgence, or from exposure to cold.

Spasmodic muscular contraction, then, of some of the urethral muscles, constituting the present impediment to the discharge of the vesical contents, what is the best method to be adopted for the speedy relief of the patient? Undoubtedly the first thing to be done, is to tranquillize him by a confident assurance of his soon being released from his sufferings. Let him be strongly impressed with the necessity of preventing, as much as possible, the urgent straining efforts to pass his water, which, he must be informed, can have no other effect than to increase the impediment to its discharge. As the spasm of the urethral muscles is sustained and aggravated by the violent contractions of the bladder forcing the urine against the strictured portion of the canal, antispasmodics, powerful and speedy in their action, are the remedies to be employed. The best of these, most certainly, is the introduction of the catheter, which should always be tried before any other. We are indeed often recommended, in surgical works, to have recourse at first to the warm bath, opium, and other internal antispasmodic remedies. These may subsequently be most useful; but urged by the most pressing appeals for instant relief, and witnessing the extreme anguish of the patient, no skilful surgeon, with a catheter at his command, will surely hesitate in attempting at once to relieve the patient from his misery, instead of proceeding *secundum artem*, by slower and less effective measures. Under whatever circumstances retention of urine may occur, it appears to me, that every other means of relief should be made subordinate to the introduction of the catheter.

The first trial, as recommended by Sir B. Brodie, may be made with a gum catheter, without its stylet, taking care to keep the urethra upon the stretch until the instrument has entered the stricture; but if it cannot be made to pass, the catheter should then be tried with its stylet. If these attempts fail, which, should

the retention be caused by a hard, very narrow stricture, is highly probable, the surgeon may very likely be successful with a small silver catheter. It will often be necessary to continue for some little time, steadily but gently pressing the instrument against the stricture, carefully keeping its point to the upper part of the urethra. By persevering in this manner, it is probable that the catheter may soon enter the stricture, which will be known by the instrument being grasped, and then the pressure may be somewhat increased. Success in these cases is only to be obtained by gentleness and perseverance. The employment of what is called force will only increase the spasm and cause some bleeding, which will clog the eyes of the catheter, and prevent the escape of the urine should the instrument enter the bladder. Besides, there is the great probability of making a false passage, which will only render matters much worse.

When the point of the catheter has entered the stricture, it should be recollected that, frequently, only the first step towards success has been attained; as the principal difficulty still to be overcome, usually arises from spasm of the compressor urethræ, and probably the anterior fibres of the levator ani muscles. By firm pressure, steadily and patiently continued, the resisting muscles may eventually become exhausted, and relax in their action sufficiently to permit the catheter to slip forward into the bladder, where it should be retained, as a general rule, for not less than twenty-four hours. If the catheter cannot be passed, an attempt should be made with a small catgut bougie to penetrate the stricture. If the point of the bougie can be made to enter the obstruction, it should be allowed to remain for a few minutes, and withdrawn during the patient's efforts to micturate, when the urine may probably follow in a very fine stream, only a small quantity passing at a time; indeed, it may sometimes require several introductions of the instrument before the bladder can be emptied. The catgut bougie should be well rounded at its point, and very gently used, to avoid tearing the urethra.

If the catgut bougie fail, a trial with one of plaster may prove more fortunate. The mere introduction of a bougie into the stricture, which so often proves sufficient for the relief of retention in strictures at the anterior portion of the urethra, is seldom so efficient in obstructions at the bulb, which, as previously stated, are increased by spasm of Wilson's and Guthrie's muscles. I have sometimes succeeded in getting a bougie through a stricture by

inserting in its point a small piece of potassa fusa, after having previously failed with the unarmed instrument.

Supposing the previous methods should have proved unsuccessful, recourse must be had to other measures. Of these, opium and chloroform are the remedies upon which our principal reliance must be placed. The patient is getting more urgent in his appeals for relief. Are there any circumstances in his case that may assist us in deciding which of the two last antispasmodics is most likely to accomplish our object? Both chloroform and opium are invaluable remedies in retention, but the former has the advantage of rapidity of action. If, therefore, chloroform be equally as well adapted to the peculiarities of the case as opium, there can be no question as to which the preference should be given.

Should the impediment to the introduction of the catheter be caused by spasm of the urethral muscles, and not by the stricture itself, which may be taken for granted, if the instrument has passed to seven inches, or seven and a half in a very long urethra—without stretching of the penis—chloroform then is the proper remedy to employ, as under its depressing influence the instrument, no longer being resisted by the urethral muscles, most probably will pass forward into the bladder. In cases in which the catheter is arrested by the stricture itself, and not by the urethral muscles, opium is the remedial agent which should be used. The irritability and inflammation of the stricture existing previously to the attempts at catheterism, have, it may be supposed, been somewhat increased by the latter, however gentle may have been the manipulations of the surgeon, whilst, at the same time, the powerful contractions of the bladder are augmenting the irritation. Here, under the full influence of opium, the vesical contractions become subdued, or greatly mitigated, whilst the stricture remains undisturbed.

When, in cases of retention, some bleeding has been caused by previous attempts to pass instruments, and the stricture has become highly irritable; then, before again resorting to instrumental interference, opium should be freely employed to quiet, as much as possible, the vesical contractions and irritability of the stricture. I place greater reliance, in the cases just described, on the exhibition of opium by the mouth than by the rectum. Its effects have appeared to me to be more decided in the subjugation of the spasm. From thirty to forty drops of the sedative solution of opium (Battley's), with fifteen drops of chloric æther, in an ounce

of camphor mixture, should be given at once; and ten drops of the former, with or without the latter, every hour or two afterwards, according to the effects produced. A hot poultice is to be applied to the perineum, and hot flannels over the lower part of the abdomen. Leeches are slow in their operation, and not, I think, so efficient in their action as the application of heat and moisture. If the hot bath can be conveniently obtained, it may prove useful as a powerful relaxant; indeed, sometimes during immersion an instrument has been passed into the bladder. But to be serviceable, the patient must be kept in the bath until he becomes faint. Opium is, however, by far the most valuable remedy in retention of urine, and when properly employed will seldom fail in eventually affording relief.

From the sympathy which exists between the rectum and urethral muscles, the action of a brisk purgative may relieve the bladder; but its effect is slower and much less sure than that of opium. The administration of a cathartic enema, which will not interfere with the action of the opium, is likely to be useful.

Sir B. Brodie, in his "Lectures on the Urinary Organs," has the following observations on the action of opium in retention of urine:—"According to my experience, the cases in which the stricture does not become relaxed under the use of opium, if administered freely, are very rare."

It is scarcely necessary to observe, that the first duty of the surgeon, in all cases of retention, is carefully to examine the perineum, to ascertain if there be any swelling or hardness in that region, as the pressure of an abscess may possibly be the cause of obstruction to the flow of urine. The abscess may be situated behind the deep perineal fascia, and, therefore, not to be felt very distinctly. If, however, any hardness can be detected by the finger, a free opening should at once be made with a bistoury; as, even supposing there should be no abscess, the incision can do no harm, and, if there be one, the evacuation of its contents may render recourse to other remedies unnecessary.

When the treatment just recommended has been carried into effect, and the patient is fairly under the influence of opium, most probably some drops of urine will be passed, more soon following; until, at length, it flows, for a few seconds, in a fine stream, the straining of the patient, and the spasmodic actions of his bladder, gradually subsiding, as the water escapes. By keeping up the

influence of opium, by the assiduous use of warm fomentations, or the employment of the hot bath, more complete relaxation of the stricture generally ensues, until he is enabled to completely empty his bladder. If the means hitherto described should fail in producing a satisfactory evacuation of the contents of the bladder—for the discharge of two or three ounces of urine must not be considered sufficient, as the kidneys will then, most probably, secrete more than has been voided—it will be necessary that something further should be done for the patient's relief. Continued retention of urine, if no relief can be obtained, must eventually prove fatal, the ureters and kidneys becoming so distended that no further secretion of that fluid can take place, the sufferer gradually sinking under low typhoid symptoms; his position, indeed, at last, exactly resembling that in which there is an entire suppression of the urinary secretion. The rupture of the urethra behind the stricture is, however, to be feared, which misfortune it must be the surgeon's especial care, if possible, to prevent. The important question is, How long will the employment of the measures previously recommended be justifiable before adopting a more certain means of relieving the bladder? Are there no signs by which the degree of distension of the bladder can be ascertained? The pathology of stricture unfortunately answers that question in the negative, as the common effect of long-continued urethral obstruction is to cause so much thickening of the walls of the bladder and contraction of its cavity, that, when distended to the utmost, it is scarcely to be felt above the pubes. The urgency of the symptoms, and the time which has elapsed since urine had been passed in any satisfactory quantity, are indeed the only guides on which dependence should be placed. Taking into consideration the usual unhealthy state of the mucous membrane behind the stricture, as well as the forcing of the urine against it by the powerful spasmodic action of the bladder, assisted by strong contractions of the abdominal muscles, if only a few drops of urine have been passed, we shall, I think, scarcely be justified in allowing an interval much beyond two days to elapse without having recourse to the operation of either puncturing the bladder, or of opening the urethra. It is right, however, here to state, that although, in general, the bladder will be found thickened and contracted, in cases of retention from stricture of long standing, there are instances in which the vesical cavity becomes much enlarged. In a case lately under my care, I drew off at one time no less than sixty ounces of urine.

The circumstances requiring, and the mode of performing, the operations for the relief of retention of urine, have been previously described. The immediate cause of retention has sometimes been a small calculus plugging up the urethral canal behind the stricture.

Retention may originate from coagulated blood in the bladder arising from various causes. It may result from regurgitation of blood from the urethra when hæmorrhage has been caused by injury of that canal by the too forcible introduction of instruments. This kind of retention may occur from disease or injury of the bladder itself; or the source of hæmorrhage may be either in the ureters, or in the kidneys. For the treatment of this kind of retention, see "Hæmorrhage from the Urethra." Retention may be caused by inflammation of the urethra, most frequently the result of gonorrhœa, the treatment of which is described in the chapter on "Inflammatory Stricture." In cases of stricture complicated with cystorrhœa, retention has sometimes been caused by the contracted passage having become so completely blocked up by thick viscid mucus, that the introduction of the catheter has been required for its removal.

It is as well here to state, that retention of urine may, of course, result from many causes quite unconnected with stricture, the most frequent of which are, probably, enlarged prostate and paralysis of the muscular coat of the bladder. A person may be so situated, that from motives of delicacy, or other circumstances, he refrains from, or is prevented, emptying his bladder at the proper time; consequently, it becomes so much distended as to lose, for some time, its power of contraction, the excessive distension of the organ causing a temporary paralysis of its muscular coat, and, very probably, requiring for several days the introduction of the catheter. Retention may ensue from temporary paralysis of the bladder, caused by a shock upon the constitution from operations, or from serious accidents. The retention which so frequently results from the ligaturing of hæmorrhoidal tumours is, I believe, most frequently caused by spasm of the urethral muscles, arising from the sympathy of contiguous parts. Sometimes, however, from the powerful shock of the operation upon the kidneys, their functions become for a time suspended, when suppression, instead of retention, of urine ensues. To the above causes of urinary retention must be added paralysis of the bladder induced by various structural lesions of the brain and spinal marrow. Disordered function

of those organs may also cause retention of the contents of the urinary bladder. A familiar example of this kind of retention is that which sometimes occurs in cases of hysteria.

Retention may be induced from closure of the preputial orifice, the result of inflammation. Not very long ago I was called to a little boy with this kind of retention, caused by a severe scald, when the obstruction was so complete, as not to admit the introduction of the smallest catheter, and I was obliged to divide the prepuce for his relief.

Amussat's method of treatment by forced injections has been previously described in the chapter on Dilatation.

Whatever may be the cause of retention of urine, unless relief be afforded to those who unfortunately suffer from it, they usually die within a week from the commencement of the attack, with symptoms of a low typhoid character. The immediate cause of death may be urinary extravasation, either from the urethra, or, possibly, from the bladder itself; and in some cases, the fatal event may result from gangrenous inflammation of the lining membrane of the vesical cavity.

The preceding remarks should be regarded merely as slight hints for the treatment of retention of urine, as the selection of the means of relief best adapted to each case will vary according to circumstances, and must, therefore, entirely depend upon the judgment of the surgeon.

CHAPTER XV.

EXTRAVASATION OF URINE.

The inflammation which generally exists on the vesical side of long-continued obstructions of the urethra may eventually cause ulcerative action, terminating in a complete breach of that canal, producing more or less extensive extravasation of urine into the surrounding cellular tissue. In such cases, the ulceration usually commences within the urethra, gradually invading the elastic tissue until the parietes of the canal at the seat of disease become so much weakened as to give way whilst the bladder is forcing the urine against the stricture during micturition.

Urinary extravasation may, however, ensue from ulceration commencing externally to the urethra, and its occurrence is explained in the following manner:—Inflammatory action not unfrequently affects the tissues external to urethral contractions, when, should ulceration take place, the mischief may extend inwardly, and so effect a breach in the urinary canal. In the latter case, however, the cellular tissue external to the urethra will most probably, in the great majority of instances, have become so condensed as to form an effectual barrier to the escape of more than a few drops of urine, the result of which is usually an abscess leaving a fistulous opening communicating with the urethral passage.

The bulbous and membranous portions of the urethra are most commonly those in which the ulcerative or ruptured opening occurs.

Extravasation of urine is always a serious occurrence, as the extravasated fluid, naturally very acrid, is rendered much more so when long retained in the bladder, and consequently proves most destructive to the tissues which it infiltrates; its progress, after a short time, when subcutaneous, being indicated by a slight

erysipelatous redness of the skin, soon changing to deep red or purple; and finally, unless free incisions be made, becoming black from mortification, the dead parts possessing a peculiarly characteristic and highly offensive odour. The constitutional disturbance is very great, and, if unassisted by surgical art, the patient soon sinks into a low typhoid state, becomes delirious, then completely comatose, and commonly dies within a week from the commencement of the extravasation.

Urinary extravasation usually happens whilst the patient is straining during the act of micturition, when he suddenly becomes relieved, and thinks his urine is being properly passed, but on examination, to his surprise, finds that none is flowing by its natural passage. Swelling of the perineum, scrotum, and penis, more or less quickly supervenes, the tumefaction probably extending to the inguinal regions. Under these circumstances, not a moment should be lost in the adoption of prompt measures to relieve the sufferer. The case is most urgent, and good surgery necessary for the salvation of the patient's life. I cannot do better than give my readers the advantage of Sir B. Brodie's advice in such an emergency, and shall therefore quote the following passage from his admirable "Lectures on the Diseases of the Urinary Organs:"—"I have already mentioned that the effusion of urine is followed by relaxation of the stricture. You will probably now be able to introduce a catgut, or some other bougie (a catgut one is to be preferred) through the stricture into the bladder. If you can do so, it is so much the better. Introduce the bougie; let the patient be held in the position in which you would place him for lithotomy; make an incision in the perineum; feel for the catgut bougie, make an incision on it, and, of course, you make an opening in the urethra. Through this opening, the catgut bougie serving you as a director, introduce a short gum catheter, from the wound in the perineum into the bladder. You will generally find, although the effusion of urine has taken place, that there is still a large quantity of urine left in the bladder. Of course it is drawn off by the catheter, and the bladder is emptied. Allow the catheter to remain in the wound and in the bladder. Then make extensive scarifications or incisions through the skin, wherever the urine has been effused underneath, and let these incisions extend to the sloughs of the cellular membrane. Apply a poultice; let the parts be fomented two or three times daily. After one or two days, you may remove the short gum catheter,

which, in the mean time, has kept the bladder empty. Your treatment, in other respects, must depend on the existing symptoms and on his general condition."

"In some cases, however, no instrument can be passed into the bladder. Under these circumstances, a free and deep incision should be made in the perineum; the superficial fascia must be well divided, so as to give ample room for the escape of the acrid and often highly putrid urine. The integuments of the scrotum, and wherever the urine has been extravasated, must be freely incised. Dover's powder, or opium in that form which is likely to agree best with the peculiar constitution of the patient, should be given; and saline medicines are often useful in mitigating the febrile disturbance which always, more or less, prevails in these cases. The bowels should be kept open with enemata. From the shock which the constitution has sustained, the nervous system becomes oppressed, and the muscular powers much prostrated. Strong beef-tea, arrow-root, wine, and occasionally brandy, must be given, according to circumstances, to support the enfeebled powers of life. The sesquicarbonate of ammonia, with camphor, often proves a useful addition to the common saline draught. When the nervous system has become somewhat tranquil, supposing the sufferer to survive the constitutional shock resulting from the extravasation, the disulphate of quina, and other tonics, should be administered; whilst the patient's strength is supported by a nutritious, but easily digestible diet. An elastic-gum catheter should be passed into the bladder as soon as possible, and retained there for two or three days, when it may probably be advantageously replaced by one of larger size."

The local effects of extravasation of urine are more or less sloughing of the skin and cellular tissue, which that highly acrid fluid rapidly destroys. The local mischief must be treated in accordance with the common principles of surgery. The sloughs, when deep, should be freely incised, and as much as possible of the putrid mass removed at each dressing. As soon as the sloughing process has commenced, a small quantity of solution of chloride of lime will prove a useful addition to the bread poultice in diminishing the fetor of the discharge which always attends so much destruction of tissue.

Extravasation of urine may occur from wounds of the bladder or urethra, resulting accidentally, or from the injurious employment of instruments. Effusion of urine from the latter cause, according

to my experience, is by no means of frequent occurrence, although it has occasionally taken place from the incision of strictures within the urethra. False passages made by bougies or sounds, are, I believe, seldom followed by urinary infiltration. It is not often that such instruments are at once thrust through the parietes of the urethra; but the injury is usually commenced in the mucous membrane. The false passage is then gradually bored through the canal, when the accompanying inflammation has ample time so effectually to consolidate the boundaries of the new channel as to prevent infiltration of urine into the surrounding cellular tissue. It is possible that the abuse of caustic in the treatment of stricture may cause extravasation of urine; but this must be a very unusual event, as when false passages are made by the misuse of escharotics, this mischief is in general gradually effected. I have never seen any case in which effusion of urine resulted from the use of caustic.

It sometimes happens that the urethra gives way behind, instead of in front of, the triangular ligament, in which case the extravasated urine may cause considerable mischief before much perineal swelling is evident. There will usually, however, be difficulty, or perhaps impossibility of micturition, also a sense of deep-seated pain in the perineum, with more or less constitutional shock. Under these circumstances, a free and deep incision should be made in the direction of the membranous portion of the urethra, which may prevent much subsequent mischief.

When the rupture takes place at the posterior part of the urethral canal, behind the triangular ligament, unless the latter should be ruptured by the pressure of the urine, the cellular tissue around the vesical neck and in the pelvis becomes infiltrated with that fluid, when there is scarcely a hope for the sufferer, recovery from such a state being an extremely rare occurrence.

The bladder has in some few instances become ruptured from distension resulting from stricture; but such an occurrence is extremely rare, as the urethra is almost certain to give way before the bladder. Urinary extravasation has been known to occur from an ulcerated opening in a vesical pouch. In these cases, from the acute inflammation caused by extravasation of urine into the pelvic and abdominal regions, death very soon follows, life seldom being prolonged beyond three or four days.

I shall conclude this subject by the following case, which may be useful in illustrating the preceding remarks.

CASE.

Whilst at breakfast on the morning of Tuesday, March 28th, 1851, a medical friend of mine was hastily summoned to the bedroom of a gentleman who had for some length of time resided with him, and not a little startled by the declaration of the patient, "I have not long to live." On examination, however, ample cause for alarm was revealed; the penis, perineum, and scrotum, appearing generally of a deep purple colour, fearfully swollen and disfigured. It was a case of too long neglected extravasation of urine. My friend having failed in all his attempts to get a small catheter into the bladder, requested my assistance at 1 P.M. The patient was a gentleman about sixty-five, rather stout, and, until the present attack, in the enjoyment of excellent general health. He had, during many years, experienced some difficulty in passing his urine, and latterly, the difficulty had much increased, micturition having been accompanied, at times, with considerable straining. On the afternoon of Saturday, the 22nd, Mr. D. first observed a little swelling of the scrotum soon after having voided his urine, which was effected with much difficulty and straining. A little urine was passed by its natural channel on the following morning (Sunday); but none afterwards to the time of my visit. The swelling increased a little during the Sunday and succeeding night. On Monday morning, so little inconvenience was felt that the gentleman went as usual to his office, but returned in the afternoon suffering considerable pain; the tumefaction having increased in the scrotum, and extended to the penis, which had become much swollen. During Monday night the distension of the affected parts so much increased, and the pain became so urgent, especially in the left inguinal region, to which the tumefaction had extended, as at length to induce the gentleman to disclose the source of his sufferings, that some relief might be obtained.

It is rather singular that this patient, although highly intelligent, well educated, and having long known that he was suffering from stricture of the urethra, should never have resorted to surgical assistance until, as the event unfortunately happened, all aid proved unavailing. On my visit at 1 o'clock P.M., the distension was very great, and the pain in the left groin most intense. The constitutional disturbance was inconsiderable, the pulse being 80, of good strength, and the tongue moist, but slightly coated with a white fur. Rigors had occurred but once, early on

Sunday morning. It was necessary at once to make a free dependent opening for the escape of the urine, and, if possible, to get a catheter into the bladder. I could not succeed in passing an instrument through the stricture, as a guide to the knife. Having, however, got a No. 2 gum catheter just into the stricture, which was at the bulb, I introduced my finger into the rectum, pushed a sharp-pointed bistoury in the direction of the membranous portion of the urethra, and then made a free incision outwards through the perineum, which was very deep from fatty deposit and effused urine. Guided principally by my finger in the rectum, for the gum catheter afforded but slight assistance, I succeeded in opening the membranous portion of the urethra, and passing the catheter into the bladder, where it was fixed. A small quantity of high coloured urine was drawn off, and the instrument plugged. Free incisions were made in the scrotum, penis, and inguinal region. I did not administer chloroform, fearing it might depress the vital powers of the patient, which it was, of course, most desirable to sustain as much as possible, to give him the best chance of supporting the extensive sloughing that must be expected from the long-continued urinary extravasation. 8 P.M.—The tumefaction of the affected parts, which had discharged freely, was greatly diminished, the scrotum especially being reduced to nearly its natural size. No pain, beyond a little occasional smarting, had been experienced since the operation. The patient had obtained some sleep and was in good spirits. The plug was removed from the catheter, and about three ounces of urine were drawn off. 26th, 9 A.M.—Has had a good night, and is entirely free from pain; pulse 100, soft; tongue moist, but more thickly coated. There is but little swelling of the affected parts. Ordered a saline draught with Dover's powder, every four hours. 27th, 12 noon.—Has had rather a restless night, but no pain; pulse 100, of tolerable strength. The wounds looked healthy, there being yet no appearance of sloughing. The patient was a little desponding. The catheter had escaped from the bladder, and I succeeded, without much difficulty, in the introduction of a No. 7, which was securely fixed. About four ounces of high coloured urine were drawn off. An effervescing draught, containing sesquicarbonate of ammonia, of soda, sweet spirits of nitre, and camphor mixture, with fresh lemon-juice, was ordered to be taken every fourth hour, also an opiate at bed-time. 28th.—Has had a much better night; the wounds still

look healthy; pulse 100, of good strength; tongue much the same. Twelve ounces of healthy-coloured urine were drawn off at twelve last night, and nearly the same quantity this morning. As the bowels had not acted, a warm aperient draught was ordered to be taken every fourth hour as long as necessary. 29th, 12 noon.—Has had rather a restless night; pulse 108, soft; tongue much furred and brown. Bowels have not acted. An aperient draught to be given every four hours as long as required. The catheter escaped from the bladder last night during the patient's restlessness. I re-introduced the No. 7 without difficulty. Some of the incisions, especially the perineal one, had a sloughy aspect, and the lower part of the scrotum was of a dark purple colour. Half-past 7 P.M.—Has had some sleep; the tongue was brown but moist; pulse 100, rather weaker. For the first time, a slight disposition to coma was observed. 30th, half-past 10 A.M.—Passed a very restless night; bowels had acted freely; the pulse was 112, and a little weaker; tongue brown and dry. There was a black slough on the lower part of the scrotum extending nearly to the perineal incision.

Sir B. Brodie saw the patient with me at half-past 4 P.M. A free incision was made through the sloughy parts, which Sir Benjamin recommended to be kept covered with lint moistened with a lotion composed of half a drachm of terchloride of carbon in a pint of water. The occasional administration of wine and brandy, with as much nourishment as the patient could bear, were also recommended. It may be here stated, that throughout this gentleman's illness, he had been well supported by strong beef-tea, arrowroot, &c., with a liberal allowance of wine and brandy. On my visit late in the evening, there was a great change for the worse in the condition of the patient, who was evidently fast sinking. He died soon after 5 A.M., on the 31st.

The inefficiency of surgical aid to save this patient from destruction, although much to be deplored, cannot excite surprise, when the length of time is considered which had elapsed from the commencement of the urinary extravasation before assistance was obtained. The urethra had evidently given way on Saturday afternoon; yet the patient went to his office as usual on the Monday, and it was not until the increasing effusion of urine caused so much distension of the skin as to excite urgent pain, that relief was at last sought.

It is to be hoped that the relation of this unfortunate case may prove a useful warning to others affected with stricture, not to neglect to apply in due time for that aid which, if long delayed, may at last arrive when too late. There can be little doubt that had this gentleman obtained proper surgical assistance before, and very probably soon after, the commencement of the extravasation, a valuable life might have been preserved.

CHAPTER XVI.

ABSCESSES AND FISTULÆ.

SUPPURATIVE inflammation, as a consequence of urethral stricture, is of common occurrence, but mostly in the advanced stages of the disease. These purulent collections, usually described as urinary and perineal, have by some authors been divided into the true urinary and simple perineal abscess, the former having a communication with the urethra, the latter having no opening into that canal. The formation of an abscess from extravasation of urine, the result of ulcerative action in the diseased portion of the canal behind the stricture, has been previously noticed.

In many cases, from the irritation caused by the stricture, the cellular tissue external to the urethra becomes inflamed, and may terminate, sooner or later, in suppuration. In some constitutions, especially when the urethral irritation is great, the inflammation is of the acute character, and the constitutional disturbance considerable, as evinced by the occurrence of rigors, followed by febrile excitement. The perineum becomes swollen, painful, and œdematous, quickly terminating in the formation of an abscess. Sometimes the perineal swelling assumes a more chronic form, being attended with but little or no pain, and may continue for weeks, and even for months, before an abscess is formed; or the inflammation may gradually disappear without ending in suppuration. Although these abscesses have in general no communication with the urethra, and therefore cannot, strictly speaking, be termed urinary, they may sometimes, as previously stated, by their pressure upon the urethra, cause an ulcerative opening into that canal, thus converting a simple into an urinary abscess.

The most serious kinds of abscess complicating urethral stricture, are those caused by ulceration or laceration of the urethra or

bladder, permitting the escape of more or less urine into the external cellular tissues.

Perineal abscesses may result from external injury.

All perineal abscesses should be opened as soon as matter can be detected, which will prevent, as much as possible, any further disintegration of the inflamed tissues.

Abscesses resulting from stricture, but having no urethral opening, do not usually become fistulous, although, if neglected, especially in strumous subjects, they may extend to the neck of the bladder, and, burrowing by the sides of the rectum, open in the nates, or even burst into the intestine itself, leaving sinuses which may require an operation.

A fistulous communication between the rectum and bladder, is occasionally the consequence of the formation of a sac in the latter, but more frequently of a sacculated state of the prostate, an occurrence which was particularly pointed out by the late Mr. Shaw.

Abscesses communicating with the urethra, whether opened by nature or art, leave for a time sinous apertures, through which urine will escape during micturition, in greater or less quantity, according to the extent of obstruction to the natural passage, the size of the urethral opening, and the direction of the fistulous channel. The more easily the urine can escape through the fistulous tract or tracts, of course the less likely will it be to pass by its natural outlet, which is more or less obstructed.

Urinary abscesses may burrow and open in several places, so that, in some aggravated cases, there may be fistulæ in the pubic, inguinal, scrotal, and perineal regions.

An urinary abscess may have no external opening, but empty itself into the urethra through an aperture in that canal, in which case an external incision should be made, communicating with the cavity of the abscess, which can be done when there is a sufficient collection of matter to be felt by the finger. A complete fistula has an urethral, as well as a cutaneous opening; when it has but one aperture, whether external, or internal, it is called incomplete. It is highly important that all abscesses connected with disease of the urethra should be opened as early as possible. There is one kind of urinary abscess that is very likely to remain for a long time undiscovered, the nature and treatment of which have been so clearly described by Sir B. Brodie, that I am induced to quote the

following passage from his "Lectures on the Diseases of the Urinary Organs:"—"A patient may apply to you, who perhaps has had gonorrhœa formerly, followed by a slight obstruction of the urethra, complaining at the same time of a discharge from the urethra, which he calls an obstinate gleet. You examine the perineum, and you find in it a small tumour, not larger than a horse-bean or filbert. It is some distance from the surface, and the patient says that it has been co-existent with the gleet, and that it is sometimes inflamed and tender. Now this little tumour indicates the existence of a blind fistula. There is a small orifice in the urethra, and a narrow channel leading from it into the centre of the tumour; and every time the urine flows, a very minute quantity finds its way into this channel, escaping from it immediately afterwards by regurgitation into the urethra. In consequence of the smallness of the cavity, and the quantity of solid matter deposited on its outside, the fluctuation of fluid in it is not perceptible. I have known this state of things to continue, producing more or less occasional inconvenience, for some years. The first thing necessary to the cure is to make an opening in the perineum, leading into the cavity in the centre of the tumour. But this may not be very easily accomplished, on account of the smallness of the cavity. You should introduce the lancet somewhat obliquely, so as divide the tumour as nearly as possible through its centre. Then introduce some lint, so as to prevent the wound from uniting by the first intention. After three or four days you may remove the lint, and then you will ascertain whether you have done what was required, by observing whether, when the patient voids his urine, any portion of it flows through the opening which you have made. If this be the case, nothing further is required than that the stricture should be dilated in the usual way. If, however, no urine flows through the opening, you may proceed thus: introduce a probe, the end of which has been armed with caustic potash (by being dipped in the caustic in a melted state), through the wound into the centre of the tumour, so as to make a considerable slough. A portion of the tumour being thus destroyed, the probability is, that when the slough has separated, it will be found that the central cavity is exposed, and that you have accomplished the object which you had in view."

Abscess of the prostate may result from stricture, most probably from the urethral inflammation extending to the prostatic

heal than the opening into the urethra; also, that the application of nitrate of silver should be confined to the bottom of the sinus.

Mr. Lloyd, of St. Bartholomew's Hospital, recommends the injection of the fistulæ twice a week with the acetum lyttæ. In some fistulous openings in the urethra anterior to the scrotum, it has been found that the only efficient means of closing the sinuses was by the urethra-plastic operation.

Absorption of the effused lymph in the neighbourhood of the fistulous tracks may be promoted by gentle frictions night and morning, with a combination of the iodide of potassium and mercurial ointments, which must be rendered milder by the addition of spermaceti ointment, if it should irritate the skin, which is frequently the case. Sometimes the occasional application of a strong tincture of iodine proves useful. The *Dublin Journal of Medical Science*, for August, 1853, contains a paper by Mr. Hamilton, of the Richmond Hospital, on the efficacy of compression in the treatment of urinary fistulæ.

Mr. Hamilton's directions for applying compression are as follows:—"If the fistula is deep at the bottom of a sulcus, as sometimes happens, it is best to put a very small compress of fuzzy lint over the opening, so as to fill up the hollow, and then graduated compresses over this; if the surface of the fistulæ is plain, a moderate sized flat compress, with one or two larger ones over it, will do; a double-headed spika bandage of strong calico keeps these in their places, and exercises a firm, steady, equable compression. The bandage should be pinned to the compress, and plenty of pins should be used at the crossings of the bandage, to prevent its slipping. The gum-elastic catheter, which has been previously introduced, may be best secured in by a piece of thread tied round the top, and the ends twisted round two pins, one in each groin, where the bandages cross. A little plug of wood in the catheter can be removed when the patient feels a desire to pass water,—it should not be done too often. If the patient says he thinks some water has come through the fistulæ, the bandage and compress can be removed, and, if found to be the case, a larger sized catheter can be passed, and fresh compresses and bandage applied, with tighter pressure. But if there is no feeling of the water having come, the apparatus may be left on for forty-eight hours; and, as the cases which have been given prove, at the end of that time the

of the fistulæ may be complete."

perhaps scarcely necessary to add, that in all cases of

urinary fistulæ, the patient's health should be kept in the best possible state by the exhibition of such medicines as may be required, by attention to the state of his urine, his diet, and his general habits. This is of the greatest importance, as being most influential in preventing the necessity of resorting to the knife.

The retention of the catheter, which was formerly a favourite method of treatment in cases of urinary fistulæ, is now but seldom adopted. Sir B. Brodie long ago pointed out the inutility, and, in many instances, injurious effects of the practice: his observations upon this subject I have previously quoted.

From the preceding observations it will be understood that the primary object in the treatment of urinary fistulæ is to remove the obstruction in the urethral canal. When this is accomplished, the fistulous openings, if situated in the perineal and scrotal regions, will general heal under the mild treatment which has been recommended. Sometimes, however, from the extreme induration of the affected parts, it will be necessary to resort to the knife for the division of the fistulous passages.

The mode in which the operation is usually performed, is by passing a grooved director or staff as far as the stricture; a probe is then introduced into the fistulous passage, and carried onward close behind the contraction, when the tissues between the probe and director are freely divided by the knife. A catheter is afterwards passed into the bladder, and retained, if practicable, until the healing of the wound is considerably advanced.

When fistulæ exist in the pendulous portion of the urethra, the case presents difficulties which are often insurmountable.

When the opening of the fistula has been small, it has been sometimes successfully closed by the twisted, or interrupted suture. Dieffenbach treated some cases with success by passing a suture round the fistulous orifice. When the thread is drawn tight, the edges of the wound are closely kept in apposition.

In cases where there has been much loss of substance, various ingenious urethro-plastic operations have been adopted, with the view of closing the preternatural aperture by a portion of healthy integument. These urethro-plastic proceedings, although sometimes successful, have generally failed in accomplishing their object. To prevent unnecessary experiments in these cases, no urethro-plastic operation should be undertaken by the surgeon before he has read the valuable practical observations of Dieffenbach on this subject.

The *Dublin Journal of Medical Science*, vol. x., contains an interesting account of Professor Dieffenbach's "New Method of Cure in Cases of Unnatural Openings in the Anterior Portion of the Male Urethra." After remarking on the facility with which even large openings are closed in the posterior part of the urethra, he observes, "How differently circumstanced is the urethra in the free portion of the penis! Here it receives an extremely meagre covering from the corpora cavernosa and its thin cutis; the latter, not thicker than the skin of the upper eye-lid, is quite inferior to the cutaneous layer of the scrotum in reproductive power, and on this account is seldom able to produce a sufficient quantity of granulations for the repair of even moderate urethral deficiencies. Associated with this, is another difficulty; namely, the constant flow of urine. The incision in the posterior portion of the urethra and neck of the bladder, made in the operation for stone, generally heals with facility. The thick mass of soft parts throws up an abundant crop of luxuriant granulations, on which the influence of the urine which trickles down is too insignificant to produce any remarkable disturbance of the curative process. In the free portion of the penis, the closure of an opening is prevented by the escape of urine, even where the fistula is small; here it deranges every plastic process, whether in cases of recent wounds of the urethra, or where inflammation has been artificially produced in the edges of an opening of long standing."

The paper in the *Dublin Journal*, from which I have quoted the preceding extract, is most instructive, and should be attentively perused by every surgeon, as it contains the fullest practical information relating to urethro-plastic surgery.

CHAPTER XVII.

CHRONIC INFLAMMATION OF THE MUCOUS MEMBRANE OF THE BLADDER.

In protracted cases of stricture, when the obstruction is considerable, the lining membrane of the bladder often becomes affected with a low form of inflammation, attended with a discharge (sometimes copious) of a white glairy mucus; hence the denomination of the disease, cystorrhœa, or vesical catarrh.

The mucous membrane of the bladder in persons who die from this affection, usually exhibits traces of long-continued inflammation, being much thickened and softened, of a yellowish, light-brown, or purplish colour, with injected vessels in spots or streaks: sometimes there is ulceration in different parts, and occasionally there are gangrenous patches. The interior of the bladder, in some instances, strikingly resembles dark grey marble, partially veined with red. When examined with the microscope, the red spots are seen to consist of highly injected vessels, with ecchymosed patches. In the gangrenous portions no distinct vessels can be detected; but in others of a dark brown hue, occasional ramifications of a deep purple colour are visible. In protracted cases, the inflammation sometimes passes along the lining membrane of the ureters to the pelves of the kidneys, and their infundibula; the latter, as well as the ureters, being frequently dilated. The mischief often extends to the glandular structure of the kidneys, involving them in a more or less destructive inflammation.

Cystorrhœa, except as a symptom of vesical calculus, is most common after the middle period of life, but more especially in advanced age. The disease may assume a mild form; but it is sometimes of a serious nature, occasionally proving fatal.

Vesical catarrh being generally dependent upon some obstruction to the evacuation of the urine, its most frequent exciting causes

are, enlargement of the prostate gland, and stricture of the urethra. In the advanced stages of the latter, cystorrhœa often forms a serious complication.

This affection may result from a loss of the expulsive power of the bladder, from its over distension, or from spinal disease, causing some portion of the urine to be retained until it becomes decomposed, and from its acrid nature producing irritation of the vesical mucous membrane.

In the severer forms of this disease the irritability of the bladder is great, and more or less pain is experienced just before, and during, micturition, especially towards its termination; the expulsion of the last few drops of urine being, in many cases, accompanied with much spasm, and a sense of burning heat along the urethra and in the vesical region. The urine has generally a cloudy appearance, and an adhesive mucous deposit gradually subsides to the bottom of the vessel in which it is placed. The mucus is, I believe, always alkaline, and more or less viscid; it is occasionally streaked with a deposit of phosphate of lime, which is sometimes observed in the bottom of the vessel in mortar-like masses. The mucus may be either transparent, with but little odour; or, on the contrary, it may be highly fetid and of a dirty brown appearance; it is sometimes yellow, from the addition of pus, or of a reddish colour, caused by an admixture of blood. The mucus is at times secreted in so large a quantity as to amount to a third part, or possibly as much as one-half of the fluid discharged from the bladder.

In the earlier periods of cystorrhœa the mucus is small in quantity, and so completely mixed with the urine when voided, that it does not become visible until the temperature of the latter has considerably fallen. The mucus may then be seen presenting a light, cloudy, opaque aspect, and gradually gravitating to the bottom of the vessel as the urine becomes cool. In the advanced stages of the disease the mucus is extremely viscid and ropy, adhering firmly to the bottom of the utensil into which it has been received. When the urine contains a large quantity of this thick glutinous mucus, the latter causes some impediment to micturition, which is performed slowly, and often with difficulty, whilst, sooner or later, the bladder loses its power of emptying itself completely of its adhesive contents, which, becoming acrid from decomposition, exert a very injurious effect upon the inflamed vesical mucous membrane. Hence, the use of the catheter in such cases becomes

indispensable. The treatment of cystorrhœa must depend upon its exciting cause, which, as previously stated, is commonly either vesical calculus, enlarged prostate, or stricture of the urethra.

The great object, therefore, in the treatment of this affection, must be the removal of its exciting cause. When dependent upon stricture, the symptomatic cystorrhœa will generally subside on the removal of the urethral obstruction, without requiring any further remedial measures. In some instances, however, the inflammation of the vesical mucous membrane may continue after full dilatation of the stricture. This may depend either upon a local or constitutional cause. Long-continued inflammation may have produced disorganization and irreparable mischief in the lining membrane of the bladder, in which the kidneys may also have become involved.

In strumous constitutions, or in persons with disordered digestive organs, chronic cystitis, although no irreparable mischief has occurred, may require treatment both local and constitutional, for some length of time after the removal of its exciting cause, especially when the vitiated vesical mucus has become more or less purulent.

The treatment of this affection, when resulting from stricture, must first be directed to the removal of its cause, for until that be accomplished, it cannot be expected that internal remedies will prove of much advantage. In many of these cases, however, so great is the urethral irritation, especially at the seat of stricture, that the usual means of dilatation cannot be borne, each introduction of an instrument doing more harm than good. Under such circumstances, the use of potassa fusa will be found a valuable means of relieving the irritation, a few gentle applications of it to the stricture often enabling the surgeon satisfactorily to accomplish its dilatation. Opium suppositories or enemata should be had recourse to at bed-time as long as they may be required by the continuance of pain and irritation in the urethra or bladder.

The internal remedies which have proved most useful in this disease, are more especially the balsam of copaiba, in doses of from five to twenty drops; small doses of cubeb pepper, the decoction of pareira brava, so strongly recommended by Sir B. Brodie; the infusions of buchu and uva ursi. The benzoic acid, in doses of from five to ten grains three times a day, has sometimes been found very beneficial, and is highly recommended by Dr. Gross. These remedies should be tried in succession, as, when one fails, another may succeed; and the combination of some of them will often prove more advantageous than when given separately. A

few drops of tincture of hyoscyamus, or of opium, may be added to any of the above remedies if required.

Sir B. Brodie recommends the decoction of pareira brava to be prepared in the following manner:—"Take half an ounce of the root of the pareira brava, add three pints of water; let it simmer gently, near the fire, until reduced to one pint. The patient is to drink from eight to twelve ounces of this decoction daily. If so large a quantity of liquid should be offensive to the patient's stomach, he may take the extract of pareira brava instead, twenty-five or thirty grains being equal to half a pint of the decoction. You may add to it moderate doses of the tincture of hyoscyamus; and in those cases in which there is a deposit of the phosphates, you may also add some of the muriatic or nitric acid. With respect to the use of acids, however, in such cases, I may observe that my experience leads me to have much less faith in their efficacy where the alkaline condition of the urine is connected with the secretion of an alkaline mucus from the mucous membrane, than when the urine has been secreted alkaline in the kidneys."

When the triple phosphates, or phosphate of lime, appear in the urine, they generally denote a constitution much impaired, a state of the general health described by Dr. Prout under the term of "nervous irritability." With regard to the deposition of the phosphate of lime, which is so frequently observed in chronic inflammation of the mucous membrane of the bladder, the same high authority observes:—"In the greater number of instances, however, the deposition is determined by local causes, acting as irritants, or exciting the peculiar chronic degenerating process, in certain tissues, which seems immediately essential to the deposition of the earthy matter. This is, perhaps, the reason why the deposition more commonly takes place in the urinary and sexual organs, than in other parts of the system—these organs being more liable to be abused and to be more frequently inoculated with morbid poisons than all the rest of the body put together. A deposition of the phosphate of lime may, perhaps, take place in various tissues; but that form of deposition we are now more especially considering, seems to be generally associated with a tissue common to the skin and to the mucous membranes. Thus the mucous membrane lining the bladder, the cavities of the kidney, prostate, &c., often throw off immense quantities of the phosphate and carbonate of lime; and from the mucous membrane of the bladder in particular, much of the phosphate of lime usually found in urinary deposits is

derived. The remainder is separated by the mucous membrane lining the cavities of the kidneys, or, perhaps, by the kidneys themselves; the quantity naturally secreted by these organs being apparently liable to be much augmented during the peculiar condition of the system above mentioned."

Should cystorrhœa continue after the removal of the stricture, in addition to the remedies previously recommended, injecting the bladder with tepid water,—a practice, I believe, first suggested by Mr. Jesse Foot,—will often prove very useful by washing away the viscid mucus which adheres to the vesical lining membrane. Injections should be used only in the more chronic forms of the disease. Sir B. Brodie, who entertains a very favourable opinion of this practice, observes: "In aggravated cases of the disease, where the symptoms are at their greatest height, the mildest injections, even those of tepid water, will do harm rather than good. They are especially to be avoided, where the mucus deposited by the urine is highly tinged with blood."

Injections of nitrate of silver, of nitric acid, and of opium, have all been used with advantage in this disease. The injections should at first be used very weak, and their strength gradually increased. Not more than one or two ounces should be used at first. Dr. Wilmot speaks highly of the effects of nitrate of silver when used as an injection in cystorrhœa. He observes, "when the secretion has become decidedly purulent, injections of nitrate of silver, judiciously used, rarely fail in greatly benefiting the case."

He commences with a solution of one grain of the salt to an ounce of water, and gradually increases its strength, but seldom exceeds the proportion of ten grains to the ounce. "At first not more than two ounces of the solution should be injected, it not being left in the bladder longer than a few seconds. The interval between each adoption of this measure is to be every third or fourth day; but as we proceed with the treatment, the interval may be diminished, while the quantity of the solution introduced into the bladder, and its strength, are to be increased."—*Opus cit.*

Sir B. Brodie, who found the nitric acid injection useful, employs not more than one minim of the concentrated acid to two ounces of distilled water to begin with, and afterwards increases it to double that proportion, allowing it to remain in the bladder only thirty seconds. Sir Benjamin recommends the operation at first to be repeated every second day, and never oftener than once daily.

Before using any of these medicated injections, the bladder

should be cleansed by injecting a small quantity of tepid water. My own experience of irrigation of the bladder is highly favourable, not only in this affection, but also in other forms of vesical irritability. In the use of these injections, however, especial care should always be taken to avoid painful distension of the bladder. Counter-irritation in the supra-pubic and perineal regions by setons, emetic-tartar ointment, and other counter-irritants, will sometimes prove an useful addition to the treatment previously recommended.

I may repeat, in concluding this subject, that chronic inflammation of the lining membrane of the bladder, resulting from stricture of the urethra, unless complicated with enlargement of the prostate gland, will generally subside on removal of the urethral obstruction. It is, therefore, principally, when this complication exists, and keeps up irritation of the bladder, that the employment of vesical injections will be required.

Acute inflammation of the bladder, I believe, very rarely occurs as a consequence of stricture. Should, however, such a complication exist, the acute affection will, of course, require much more active antiphlogistic treatment than the chronic; both general, as well as local, bleeding being almost indispensable.

CHAPTER XVIII.

SACCULATED BLADDER.

This affection, commonly denominated hernia of the mucous membrane of the bladder, is the result of some obstruction to the free egress of the urine, produced by stricture of the urethra, enlarged prostate, or vesical calculus.

Of these causes, stricture of the urethra is probably the most frequent. Mr. Shaw was led to the conclusion from a great number of dissections of strictured subjects, that a sacculated state of the bladder is a very common occurrence in urethral affections. He observes, "If a very narrow stricture has existed for a certain time, and the patient has suffered occasional attacks of retention of urine, a sac has probably formed."—*Opus cit.*

The bladder, in consequence of the obstruction to the expulsion of its contents, being excited to increased action, its mucous membrane, at length yielding to the distension of the urine, is forced through some of the interstices of the muscular coat of that organ. Mr. Guthrie, who believed sacculation of the bladder to be occasionally caused by the bar-like ridge at its neck, considered the arrangement of the vesical transverse and longitudinal muscular fibres favourable to the occurrence of sacculation, as the fibres cross each other at right angles, leaving small intervals occupied only by mucous membrane and cellular tissue. It is through these spaces, unprotected by muscular fibres, that Mr. Guthrie believed that the protrusion of the mucous membrane takes place. The protrusion, small at first, may go on increasing until it attains considerable magnitude.

The pouches are mostly formed at the sides and posterior part of the bladder; they vary in size, containing from a few drops to several ounces of urine. There are commonly not more than three or four of these pouches, although a greater number have been

sometimes observed. They are formed by the mucous and peritoneal coat of the bladder, the former being usually more or less thickened from inflammation, often secreting a purulent fluid, which is mixed with the urine.

The vesical opening of the pouches may be so small as scarcely to admit the introduction of a moderate-sized quill, or sufficiently large for the introduction of the closed hand. They sometimes contain calculous concretions, and their internal membrane commonly becomes thickened from inflammation.

Sir B. Brodie observes, that "these cysts are generally small, but occasionally they attain a large size; and it is remarkable that they sometimes contain what appears to be pure pus, while the bladder, with which they communicate, contains only urine."—*Opus cit.*

From the close similitude which the symptoms of sacculation of the bladder bear to those of some other vesical affections, its diagnosis is usually more conjectural than positive, and the existence of the pouches is often unsuspected until disclosed by a post-mortem examination.

The signs of sacculated bladder are seldom well marked. Mr. Guthrie mentioned, as an indication of this disease, a peculiar sensation communicated to the hand by the catheter, after expulsion of the last few drops of urine, as if a smart blow had been given to the instrument; in some instances, the impulse has been more gentle, described by that surgeon as "the fluttering blows of the bladder," from their resemblance to the blows given by the wings of a bird in fluttering. Mr. Guthrie has informed us that, in one instance of this affection, "the silver catheter often received so smart a shock, that it was forced out a couple of inches." At the examination after death, five pouches and the bar at the neck of the bladder were observed. Mr. Guthrie considered that "the peculiar fluttering strokes of the bladder on the catheter were caused by the descent of the pouches containing urine, and by their being more or less solid substances, they fell against the instrument, or were brought forcibly against it, by the muscular efforts of the bladder in contracting on the evacuation of the last few drops of urine from its cavity."

The pouches being seldom completely emptied, the urine is more or less offensive. In one of Mr. Guthrie's cases, the patient complained most, that after micturating in the erect position, on lying down in bed, he felt as much inclination as before to pass his urine,

and that by straining forcibly he could void a small quantity. He obtained relief by first drawing off his urine whilst standing; and afterwards by lying down and varying his position from either side to his face, the most favourable posture for emptying the pouches, he was enabled to get rid of some more, which relieved him for a time.

In one case of this kind, Mr. Guthrie found that after drawing off the urine by the catheter, and as he supposed emptying the bladder, he could still get more by passing the instrument in a certain direction, in all probability into one of the pouches.

In another case, the existence of one or more pouches became evident on injecting the bladder; twelve ounces of warm water could be thrown into it before much uneasiness was produced; but on drawing it off, ten ounces only could be obtained, and nearly the whole twelve by any change of position.

It appears that in cases of sacculation of the bladder described by Mr. Guthrie, the most marked symptoms were the concussions caused by the descent of the pouches against the catheter, when drawing off the urine; and the patient finding that after he had apparently emptied his bladder in the erect position, by changing it to the recumbent, and turning upon either side, or on his face, he was enabled to get rid of more water.

Mr. Shaw, when describing this disease, observed, "The following questions naturally occur to us:—If a sac has formed, is it ever spontaneously removed? Is it not probable, that a certain quantity of urine will generally lodge in the sac? What will be the consequences of the lodgment of urine?

"The difficulty of determining whether certain symptoms are produced by the presence of the sac, or by some other cause of irritation, will make it almost impossible to resolve with certainty the first question: the second, I fear, must be answered in the affirmative; and in reply to the third and most important, I would be inclined to say, that the lodgment of urine in a sac produces a very peculiar train of symptoms, constituting a disease that is often fatal, the patient's death being occasionally preceded by symptoms of peritonitis."

Mr. Shaw observes, "I cannot with accuracy point out any particular symptoms by which we may predict the formation of a sac; I will, however, hazard the opinion, that, when in severe cases of stricture, there is a peculiar irritation about the back part of the bladder and between it and the rectum, especially if this occurs

after voiding urine, we may suspect that a sac has formed."—*Opus cit.*

A case of sacculated bladder, in which the pouch was large enough to contain more than half a pint of fluid, and far exceeded the size of the bladder, is mentioned by Dr. Wilmot in his work on Stricture. The case was laid before the Dublin Pathological Society by Mr. Fleming. "The sac was situated at the back of the bladder, towards its fundus; and communicated with it by a narrow circular opening capable of admitting a catheter, about No. 12 or 14."

It is stated that "his prominent complaints were frequent, urgent, and painful desire to pass water, and various neuralgic sufferings in and about the region of the bladder. A No. 10 catheter passed with ease into the bladder. The man died of chronic peritonitis. On post-mortem examination, the ordinary appearances of peritonitis were visible, and towards the pelvis were more intense. Here in the cul-de-sac, behind the bladder, there was superadded a copious effusion of fetid urine, mixed with shreddy materials, which were found to be the *débris* of a gangrenous patch on what appeared at first to be a distended bladder which had given way. Here a large pouch, as if growing out from it, occupied the whole cavity of the pelvis, displaced laterally the rectum, and tilted upwards and rather forward the bladder, which was small and contracted. At the lower and back part of this pouch, a sloughy opening presented itself. The kidneys were healthy, the left ureter somewhat dilated near its connexion with the bladder; and the latter contracted, thick-coated, and irregular on the mucous surface as usually presented in its chronic affections. At its back part, towards the fundus, was a circular opening, perfectly smooth, and lined with mucous membrane. This led into a large adventitous pouch, similarly lined. Fetid urine, mixed with pus, mucus, and sloughy shreds, lay partially confined in it, and intermixed were found some irregular lithic acid and calculi. In the neighbourhood of the sloughy patch alluded to, the lining of this cavity presented somewhat an ulcerated surface."—*Opus cit.*

The following case of sacculated bladder is mentioned by Sir B. Brodie: — "An old gentleman consulted me labouring under disease of the prostate gland. He had frequent inclination to void his urine; and on introducing the catheter, immediately after he had voided it, about three or four ounces of urine were found to have been left in the bladder. But what he chiefly complained of

was an uneasy sensation in the rectum. He gave it the name of a *worming* sensation; and said it was as if a worm were crawling between the bowel and the bladder. One day, after drawing off the usual quantity of urine, on introducing the catheter a little further, to my surprise half a pint of pus came away. The same thing occurred two or three times afterwards. At first I was inclined to believe that the catheter had entered the cavity of a common abscess. But it was not long before I had an opportunity of ascertaining the real nature of the case. The patient died; and on examining the body, the prostate gland was found a good deal enlarged; there were three cysts, of various sizes, communicating with the bladder. The largest of these was situated between the bladder and the rectum, and contained half a pint of pus. There was no ulcerated surface; and it appeared that the pus must have been secreted by the mucous membrane of which the cyst was composed."—*Opus cit.*

The treatment of sacculated bladder is comprised in a few words. To remove, if possible, the obstruction which is its usual cause. Attention to the general health, the employment of such remedies as are usually found most efficient in the relief of vesical irritation. The best, and indeed almost the only method of affording relief in this affection, is to keep the pouches as well emptied as possible by the judicious introduction of the catheter, and the frequent injection of the bladder by water as warm as can be borne with comfort. The addition of opium to the injection is sometimes useful in allaying irritation and pain.

CHAPTER XIX.

BAR-LIKE RIDGE, OR CHRONIC THICKENING OF THE NECK OF THE BLADDER.

This affection was first clearly described by the late Mr. Guthrie, in his work on the "Anatomy and Diseases of the Bladder and Urethra," published in 1834. Mr. Guthrie satisfactorily demonstrated "that the elastic structure at the neck of the bladder may be diseased, without any necessary connexion with the prostate gland."

Civiale, in his "Traité pratique sur les Maladies des Organes Genito-Urinaines," has, however, asserted that this bar-like ridge had been previously described by himself and others. It is due to the memory of Mr. Guthrie, to inquire upon what grounds his claims to the discovery of this morbid structure have been lately questioned by Civiale.

To prevent the possibility of any misunderstanding, I shall quote, *verbatim*, Civiale's observations which particularly relate to this subject. They are as follows:—"Des le début de ma pratique, en 1822, je rencontrai des malades chez lesquels le passage des instruments droits, au col de la vessie, était difficile ou même impossible. En 1823, j'indiquai le procédé, à l'aide duquel on parvient à faire passer la sonde par-dessus *le moyen lobe* et le *repli membraneux* du col vésical. C'est par la lecteur des ouvrages de Home, de J. L. Petit, et par mes propres recherches, que j'avais été conduit à étudier ces dispositions morbides.

"Dans le Traité de la Lithotritie, publié en 1827, j'ai précisé davantage ce que j'avais indiqué, en 1823, au sujet des lésions de la prostate, de la créte urèthrale et du repli formant barrière à l'orifice interne de l'urèthre. Dans quelques cas plus rare, est-il dit, un rebord membraneux s'étend d'un lobe latéral de la prostate à l'autre, et forme une espèce de bride. Et en

décrivant le cathétérisme au moyen des sondes droits, j'ai dit:—'S'il y a lieu de croire que les difficultés sont produites par un engorgement partiel de la prostate, il convient de n'abaisser davantage la main (afin de relever l'extrémité oculaire de la sonde) que lorsque celle-ci est arrivée au milieu de la portion prostatique. Il en est de même lorsque l'extrémité de la sonde se fourvoie dans les cavités qui se trouvent sur les côtés de la créte urèthrale, ou quand l'obstacle est *formé par une espèce de bride qui s'étend d'un lobe de la prostate à l'autre.*'

"Dans le même traité, et aussi dans ma deuxième *Lettre sur la Lithotritie*, publiée en 1828, j'ai donné les détails de plusieurs faits qui prouvent que, à cette époque, j'avais distingué l'obstacle dont il vient d'être question d'un autre situé plus en arrière, qu'on rencontre après avoir franchi le col vésical, et qui est produit par des tumeurs fongeuses, ou prostatiques quelquefois assez développées pour faire renoncer à la lithotritie.

"Plus tard, en 1837, dans le premier volume de mon *Traité pratique*, la question exigeant des détails plus précis, je m'exprimai de la manière suivante:—'Indépendemment de la déviation de l'urèthre qui résulte de l'engorgement du corps de la prostate, il est un autre espèce, produite par *un soulèvement transversal de la partie inférieure du cercle fibreux constituant le col de la vessie, et en particulier par le repli également transversal* de la membrane muqueuse qui *recouvre la partie soulevée et forme un rebord ligamenteux ou membraneux* étendu du lobe moyen à chacun des lobes latéraux ou quelquefois d'un lobe latéral à celui du côté opposé.'

"Qu'on le remarque bien, je signalais, en 1823, comme *un obstacle fréquent* à l'introduction des instruments dans la vessie ce qui avait déjà frappé Deschamps, et d'autres chirurgiens Français, ce que Houship indiquait en même temps en Angleterre, comme *un fait rare et curieux*. Enfin, ce que dix ans plus tard M. Guthrie décrivait sous le titre de *barrière*. Je l'avais fait connaître, même différentes reprises, sous les noms déjà usités de *plis, brides, replis, valvules*. Les citations qu'on vient de lire ne laissent aucun doute à cet égard."—*Opus cit.*

It will be seen, from these quotations, that it was not until 1837 that Civiale, in his "Traité pratique," &c., published a description of the disease of the elastic tissue at the neck of t[illegible] h constitutes the bar-like ridge so minutely descril in 1834. The only obstructions at the vesical

Civiale prior to that period are described in 1823 as "*le repli membraneux du col vésical.*" In 1827, as "*lésions de la prostate; de la crête urèthrale; et du repli formant barrière à l'orifice interne de l'urèthre, un rebord membraneux,*" extending from one lobe of the prostate to the other, and forming a kind of bridle (*bride*). In 1828, Civiale mentions obstructions caused by "*des tumeurs fongeuses, ou prostatiques.*" It was not until the publication of his "Traité pratique," &c., in 1837, that we find any description by that writer of the disease of the *elastic* tissue at the vesical neck—the bar-like ridge of Mr. Guthrie.

We are, indeed, assured by Civiale that the true nature of this vesical bar was known to, and publicly noticed by, himself and others, so long as ten years before the publication of Mr. Guthrie's work, and that this affection had been described by him at different times under the names of "*plis,*" "*brides,*" "*replis,*" and "*valvules.*" These definitions of Civiale, whatever meaning their author might have intended them to bear, do not certainly *express* that kind of vesical obstruction to which attention was so particularly drawn by Mr. Guthrie, to whom undoubtedly belongs the credit of having been the first to *describe* the disease of the elastic structure at the neck of the bladder, constituting a bar-like ridge. Although it appears that this morbid affection was previously well known to Civiale, Mr. Guthrie's dissections proved "that the elastic structure at the neck of the bladder may be diseased without any necessary connexion with the prostate gland; and that the prostate may be diseased without any necessary connexion with the elastic structures." Mr. Guthrie observed that he had established, in the most clear and decided manner, the existence of "a separate disease of the neck of the bladder, which had been hitherto considered as dependent on an affection of the third lobe of the prostate."

He alludes to a preparation of Mr. Andrews of an enlarged prostate which had drawn up the mucous membrane of the bladder so as to form a bar across its under part, and observes, "In this case the disease was exactly the reverse of the others; the prostate was alone affected, and the bar formed at the neck of the bladder consisted of its mucous membrane, elevated, and drawn tight across the under part of the opening, in consequence of its connexion with the subjacent parts."

The bar-like ridge which is situated transversely at the inferior portion of the neck of the bladder, consists in more or less thick-

ening of the mucous and cellulo-fibrous tissues of the affected part. In its advanced stage the ridge is of a firm, dense structure, being usually from an inch to two inches in length. From its occupying the situation of the part which has usually been considered a third lobe of the prostate, with which it has generally a close connexion, there can be little doubt that previous to the observations of Mr. Guthrie upon the subject, this disease had been commonly mistaken for an enlargement of that gland, and that he was fully justified in claiming for himself the discovery of its true nature. Mr. Guthrie observes, that "In its simple or first stage, when there is only a defect of elasticity, it gives rise to stricture at the very neck or orifice of the bladder, curable by common means, if properly applied. In the second stage, when the bar is formed, and becomes more or less rigid, a small bougie rests against it, and, if made of soft materials, bends, and cannot be made to proceed; if a solid instrument, it passes into one of the hollows, on each side of the white central line, which are also deepened by the elevation of the uvula vesicæ, catches on the valve at the entrance, and when the handle of the instrument is depressed, it raises the bladder, rectum and all, upon its point, until the pain or resistance induces the surgeon to forego the depression; or the valve yields, or is torn, when it finds its way into the bladder; or perhaps the surgeon, not possessing much experience, is satisfied with the distance the instrument has gone in, and supposes it has passed into the bladder.

"When the disease reaches its third stage,—or that which gives rise to considerable difficulty and straining to pass water, and which cannot always be effected,—many serious symptoms arise." Mr. Guthrie describes this disease as usually affecting persons of advanced age, although it sometimes commences at an early period of life; like the chronic enlargement of the prostate gland, it is very insidious in its progress. This affection, from its very gradual occurrence, will generally have advanced to a considerable extent before it is discovered. Its symptoms, according to Mr. Guthrie, are more or less difficulty, and increased frequency of micturition. As the disease advances, the desire and difficulty of micturition increase, attended with pain in the vesical region, which is relieved for a short time on passing a little urine, but soon returns, as the bladder is scarcely ever completely emptied. The urine is more or less vitiated, containing a quantity of ropy mucus, the disease being, in fact, complicated

with cystorrhœa, the mischief frequently extending to the kidneys. Mr. Guthrie has also particularly noticed the occurrence of pouches of the urinary bladder as a consequence of this affection. The power of the constitution at length gives way, and the patient gradually sinks, completely worn out by long-continued suffering. The diagnosis of this disease is often exceedingly difficult from its symptoms bearing so striking a resemblance to those of chronic enlargement of the prostate gland, with which it is often associated. As the latter affection, however, is one of advanced life, if, with the characteristic symptoms of the bar-like ridge occurring in an early or middle period of life, an obstruction be constantly experienced at the neck of the bladder on the introduction of an instrument, the diagnosis will be much less difficult. Although the symptoms of the bar-like ridge are the same as those of urethral stricture in its advanced stage, yet the situation of the obstruction at the neck of the bladder will sufficiently distinguish it from the latter affection, which has very rarely been observed beyond the membranous portion of the urethra. When similar symptoms arise from vesical calculus, the introduction of the sound will soon elicit the cause of their occurrence. If the symptoms result from general enlargement of the prostate, the true nature of the case will most probably be detected by the introduction of the finger into the rectum; but should the enlargement be confined to the middle lobe of the gland, forming a projection at the neck of the bladder, I know of no means of distinguishing that affection from the bar-like ridge.

The treatment of this disease must depend greatly upon its complications: of these, the more distressing are those of cystorrhœa and sacculated bladder, the treatment of which has been previously described.

With regard to the local treatment of this affection, Mr. Guthrie observes: "When the disease occurs in persons under or about the middle period of life, the steady use of a solid silver sound, gradually increasing the size to the largest the urethra will admit, will gradually effect a cure; although, to prevent a relapse, it should be passed occasionally." When there is inability to empty the bladder completely, the regular introduction of the catheter will be required. Mr. Guthrie has found great benefit to arise from washing out the bladder every other day with water as hot as can be well borne with comfort to the patient. A full-sized silver catheter, when it can be passed, was used by Mr. Guthrie in these

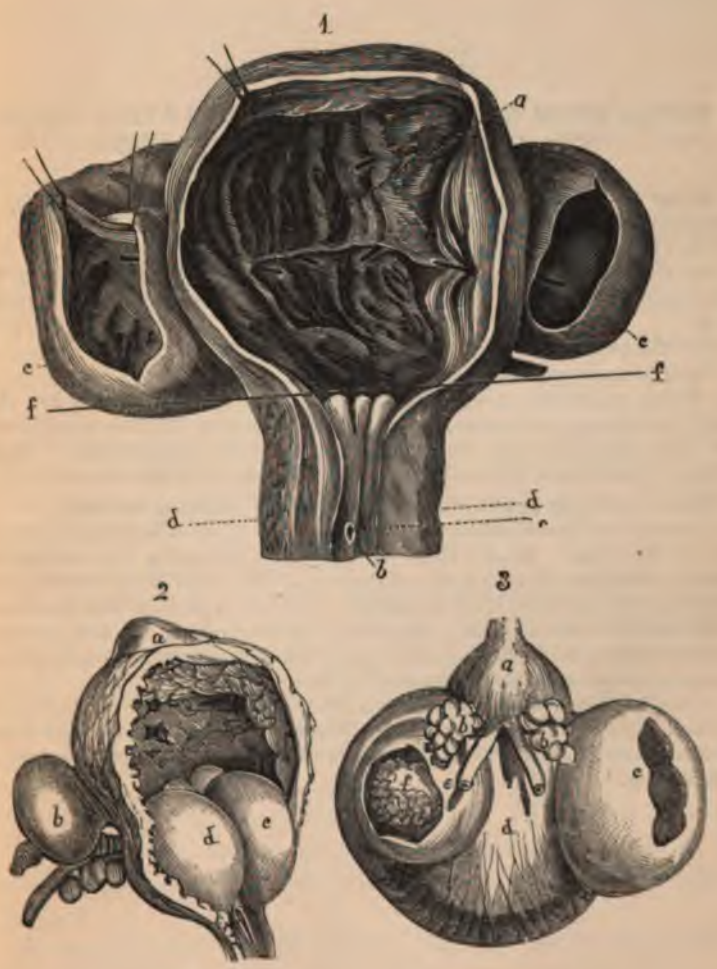
cases; and he thought its occasional retention, if it could be borne without much irritation, was likely to prove beneficial by promoting, in some degree, absorption of the bar-like ridge. In cases where, notwithstanding the regular introduction of the catheter and sound, the disease still advances, and the patient's sufferings increase, Mr. Guthrie recommended division of the ridge by an instrument of his invention, very similar to the central perforator or lancet of Mr. Stafford. When all the means previously suggested fail, and the patient is becoming exhausted by the severity of his sufferings, Mr. Guthrie thought that a proceeding similar to the lateral operation for lithotomy might still afford a fair chance of relief. He recommended that the incision "should never extend quite to the boundary, or external wall or covering of the prostate gland. It need not be of a larger size than will admit the finger easily to examine the neck of the bladder, and to ascertain that the division of it and of the bar has been properly accomplished." Mr. Guthrie adds, that he has not had the opportunity of doing this operation, and that he cannot therefore recommend it as sanctioned by experience, but must be contented to suggest its practicability.

My own observations relating to the bar-like ridge have not been very satisfactory; for although I have occasionally met with obstructions at the neck of the bladder when no enlargement of the prostate was perceptible on examination by the rectum, yet, as most of them occurred in persons of rather advanced age, I had no means of positively ascertaining whether the symptoms resulted from the bar-like ridge, or from hypertrophy of the middle prostatic lobe. In two cases under my care, in which there was great difficulty in micturition, combined with incontinent dribbling of urine, especially during the night, I found that, after having succeeded in getting an instrument through a hard stricture at the bulb, there was a second obstacle at the neck of the bladder quite as difficult to surmount. The latter obstruction, which felt rigid, yielded very slowly to the introduction of steel sounds, with an occasional application of potassa fusa. Although at first inclined to attribute the obstruction to some enlargement of the prostate; yet from the patients being only of middle age, and completely recovering, I have now but little doubt that the obstacle at the vesical orifice arose from the disease so clearly described by Mr. Guthrie.

A brief description of the following case, which I have little

doubt was an instance of the disease in question, may prove a useful practical conclusion to the present subject. I was consulted several months ago, by a gentleman about fifty years of age, who had suffered, during many years, from more or less pain and difficulty of micturition, with irritability of bladder. He had been for some length of time under the care of an eminent surgeon, who had succeeded in dilating the obstruction sufficiently to permit the introduction of a No. 10 metallic sound, when he left his professional adviser, and continued regularly passing for himself the same sized instrument until his application to me. At that time he suffered from great irritability of bladder; so urgent, indeed, was the desire of micturition, that scarcely any rest could be obtained during the night without having recourse, at bed-time, to a strong opiate enema. He suffered much, at times, from pain in the region of the bladder; and his urine usually contained a considerable quantity of mucus. The urine was passed with much straining, and in a very small interrupted stream. I could pass a full-sized sound as far as eight inches; but could not succeed in passing a bougie of any size beyond. With some difficulty I at length succeeded in introducing a No. 7 silver sound into the bladder, which passed with a jerk, apparently over a ridge at the vesical orifice. On a careful examination of the prostate through the rectum, whilst the sound remained in the bladder, I could detect no enlargement of that gland, and therefore concluded, as the disease had existed for many years, that the cause of obstruction was the bar-like ridge. I was convinced, as was the patient himself, that the No. 10 sound, which he had been regularly using, had never entered the bladder, for it always stopped at about eight inches, and never afforded any relief. I gradually increased the size of the sound to No. 10, with very great relief to the patient; so much so, that the irritability of bladder and cystorrhœa nearly subsided. On increasing the size of the instrument, however, to No. 11, so much irritation ensued, that most of his previous sufferings returned as bad as ever, and he, very naturally becoming dissatisfied, discontinued his attendance upon me. I have since learned from a friend of the patient, that he consulted two other surgeons, who assured him that he had no stricture, from the circumstance, I presume, of the general non-occurrence of that disease so far back in the urethra. It will be seen that in one of the cases of this disease, to which allusion is made in the general observations, I had recourse to an

occasional application of potassa fusa; but it was in a very mild form, merely for the purpose of allaying irritation; and it certainly appeared to me to produce the intended effect, most probably by relieving the inflammation of the affected part.



EXPLANATION OF THE PLATE OF THE BAR-LIKE RIDGE, AND SACCULATION OF THE BLADDER.

Figure 1.—"*a.* The inside of the bladder in a highly inflamed state, the anterior part having been removed.

"*b.* The urethra slit open.

"*c. c.* Two large pouches cut open: bristles are inserted into their orifices of communication with the bladder, and into those of three others which existed in it.

"*d.* The prostate gland a little enlarged on the right side.

"*e.* The caput gallinaginis or verumontanum.

"*f.* The nipple-like process at the neck of the bladder, divided into three small prominences, and forming a bar or dam, preventing the free evacuation of the urine, and ultimately the cause of the death of the individual."—*Guthrie "On the Anatomy and Diseases of the Neck of the Bladder and of the Urethra."*

The two following figures are from Mr. Maclise's "Surgical Anatomy."

Figure 2.—"The lateral lobes of the prostate, *c d*, are enlarged, and contract the prostatic canal. Behind them, the third lobe, of smaller size, occupies the vesical orifice, and completes the obstruction. The walls of the bladder have hence become fasciculated and sacculated. One sac, *a*, projects from the summit of the bladder; and another, *b*, containing a stone, projects laterally. When a stone occupies a sac, it does not give rise to the usual symptoms as indicating its presence, nor can it be always detected by the sound."

Figure 3.—"The two sacs appear projecting on either side of the base of the bladder. The right one, *e*, contains a calculus, *f*; the left one, *e*, larger dimensions, is empty. The rectum lay in contact with the base of the bladder, between the two sacs."

CHAPTER XX.

INFLAMMATION OF THE PROSTATE GLAND—PROSTATITIS.

This is a much less frequent effect of stricture than might be expected from the proximity of the prostate to the bulbous portion of the urethra, the most common seat of obstruction. Even in aggravated cases of stricture, attended with considerable inflammation of the urethral mucous membrane, extending to its prostatic portion, the gland itself usually escapes without apparently participating in the inflammation; at least, such is the result of my experience. The structure of the prostate must surely be unfavourable to the occurrence of inflammation, or that affection would be more common, considering the many probable causes of inflammatory action to which the gland is exposed, such as gonorrhœa, stricture, and sexual indulgences.

As, however, the urethral inflammation attending stricture, especially when the obstruction is at the posterior part of the canal, may sometimes extend to the prostate, causing more or less inflammation of that gland, I shall offer a few brief observations upon its nature and treatment. The pre-disposition to prostatic inflammation appears to be least in early youth and advanced age; the period when the sexual organs are in their highest vigour being that in which it is most likely to occur. Prostatitis is not a primary affection, being, with few exceptions, the result of extension of inflammation from neighbouring parts, or of mechanical injury.

The symptoms of this disease are, increased frequency and difficulty of micturition, with an aching and bearing-down pain about the neck of the bladder, the pain extending along the urethra to the perineum and pubes. The desire to void urine is sometimes most urgent, and almost incessant; micturition being attended with an acute sense of scalding, which is at times extremely severe.

Complete retention of urine may occur. Painful sensations are experienced in the rectum, particularly a feeling of weight and bearing down, with tenesmus. The pain is increased by whatever causes pressure upon the inflamed part, such as the contractions of the bladder in micturition, expulsion of the fæces, and the sitting posture. The inflammation sometimes extends to the neck and bas-fond of the bladder, greatly increasing the vesical irritability, and adding considerably to the sufferings of the patient, especially on expulsion of the last few drops of urine, when the pain is often most acute, and continuing for some minutes after micturition. The constitutional disturbance is great, evinced by high febrile excitement, the patient sometimes becoming delirious. The above are the signs of acute inflammation of the prostate; when less intense, or what is called sub-acute, they will be milder; and should the disease occur in scrofulous persons, its progress will probably be so insidious that suppuration may ensue without any well-marked indications of the mischief which has occurred. The true nature of the disease can generally be ascertained by the introduction of the finger into the rectum, when the gland will be tender on being pressed, and more or less swelling will usually be detected. The enlargement of the gland may, however, be principally in an upward direction, when, on the introduction of an elastic-gum catheter, the point of the instrument will be more or less obstructed by the tumefied prostate. Should the feeling of weight and bearing down increase, accompanied by a throbbing pain and occasional rigors, there can then be little doubt that suppuration has taken place in the affected part. It should always be recollected, however, that an abscess of the prostate may occur without any well-marked symptoms.

If left to itself prostatic abscess most commonly bursts into the urethra or bladder, where it meets with least resistance. It may, however, burst into the rectum, or open externally, by making its way through the perineal tissues, the latter being the most fortunate locality for the patient.

Treatment.—The great object of this should be to prevent suppuration of the inflamed gland, which may be attended with the most serious consequences. The horizontal position must be strictly enforced. Blood should be taken by cupping on the loins, and by the application of leeches to the perineum; and if there be much febrile excitement, and no contra-indication exist, the local must be preceded by general bleeding, so as to produce a decided effect

upon the system; the bleeding should be followed by the assiduous applications of hot fomentations to the perineal, pubic, and hypogastric regions.

Immersion in a hot bath until the patient becomes faint has often produced an excellent effect, especially in the early stage of the disease. An active aperient should be given, and after its action an enema, containing fifty drops of laudanum in two or three ounces of gruel, should be administered. The repetition or not of the local bleeding must be regulated according to the symptoms. Next to the free extraction of blood, I believe there are no means more likely to prevent suppuration than the exhibition of small doses of calomel, continued if the symptoms denote the persistence of inflammation, until the gums become slightly affected. This plan is recommended by Sir B. Brodie, and is that which I have commonly adopted. To an adult I have usually given two grains of calomel, with five of Dover's powder, every four hours, with the addition, when the fever has been high, of the sixth of a grain of emetic tartar. The bowels should be kept gently open, but not irritated by the exhibition of drastic medicines. When retention occurs, a small elastic-gum catheter, without its stylet, should be regularly introduced, so as to prevent uneasy distension of the bladder, and the consequent forcing of the fluid against the tender prostate.

When suppuration has occurred, the abscess must, if possible, be prevented from bursting internally. As soon, therefore, as the least swelling or hardness can be detected in the perineum, a free opening should at once be made by passing a sharp-pointed bistoury in the direction of the prostate, which can be safely guided by the assistance of the left index finger previously introduced into the rectum. This is the method which I have pursued in cases in which there have been indications of a deep-seated urinary abscess, and have never had cause to regret the proceeding; it is one also which will often save the patient much suffering and misery.

The following are the observations of Sir B. Brodie upon this subject:—"When an abscess of this kind has been opened, or has burst in the perineum, it generally happens that a portion of the urine flows through it, showing that it communicates with the urethra as well as externally. This prevents it from healing, and in order that the inconvenience should be relieved, a full-sized bougie or catheter should be introduced from time to time, under which treatment the healing will soon be completed.

Complete retention of urine may occur. [illegible] symptoms as would lea
perienced in the rectum, particularly a [illegible] in the prostate, commu
ing down, with tenesmus. The pain [illegible] should direct him not
causes pressure upon the inflamed part, [illegible] remain altogether in the
the bladder in micturition, expulsion [illegible] him in the use of the gum
posture. The inflammation sometim[illegible] himself whenever he has
bas-fond of the bladder, greatly incr[illegible] may always make water by
and adding considerably to the suffer[illegible] his own efforts. In some
on expulsion of the last few drops [illegible]er to be constantly retained
most acute, and continuing for some [illegible] abscess has healed; but this
constitutional disturbance is great[illegible] neck of the bladder; and the
ment, the patient sometimes becom[illegible]er is, for the most part, to be
signs of acute inflammation of [illegible] this excites irritation, and the
or what is called sub-acute, the [illegible]
disease occur in scrofulous pers[illegible] detected in the perineum, the
insidious that suppuration ma[illegible] should a fluctuating swelling be
indications of the mischief wh[illegible]ening must be made in the most
of the disease can generally [illegible] by the introduction of a curved
the finger into the rectum, wh[illegible] by the finger.
pressed, and more or less sw[illegible] abscess, not often mentioned
enlargement of the gland [illegible] noticed by Professor Gross, who
upward direction, when, on [illegible]st into the peritoneal cavity, at
catheter, the point of t[illegible]e prostate, and so cause fatal
obstructed by the tumefied [illegible] which is fortunately very rare, is
and bearing down increa[illegible] pelvic region, a small, quick, and
occasional rigors, there can[illegible] and rapid prostration of the
taken place in the affected [illegible]urs in from thirty-six to forty-
however, that an absce[illegible]
well-marked symptoms.

If left to itself prost[illegible]e of prostatitis, the antiphlogistic
urethra or bladder, wh[illegible] but when abscess has occurred, and
however, burst into t[illegible] the patient's strength must be sup-
way through the peri[illegible] by the administration of quinine
nate locality for the [illegible]

Treatment.—The [illegible] into the urethra, the opening may
ration of the inflam[illegible] the life of the patient. These pros-
serious consequenc[illegible]ed with considerable irritability of
enforced. Blood sh[illegible] the urine entering the sac of the
the application of [illegible]ritation. In these cases opium is the
febrile excitement [illegible] relief will be obtained. Occasional
be preceded by g[illegible] warm water are also sometimes very

CHAPTER XXI.

HYPERTROPHY, OR CHRONIC ENLARGEMENT OF THE PROSTATE GLAND.

In this affection, familiarly known as senile hypertrophy, from its rarely occurring except in advanced life, the gland becomes very gradually enlarged, varying in size from a slight increase of its normal proportions to that of a hen's egg, or small orange, although, in some instances, it has attained a much greater magnitude. The hypertrophy usually, but not invariably, affects, in some degree, the entire gland, one of the lobes, however, being more enlarged than another. Sir Everard Home, to whom we are indebted for the most valuable practical information upon this disease, found the left lobe to be the one most frequently enlarged; a fact which, although not confirmed by other pathologists, certainly merits attention, emanating as it did from one whose experience was probably greater than any other writer upon the subject. There appears no very satisfactory reason for this greater liability to enlargement of the left than of the right lobe. We may possibly find an explanation of the fact, supposing it to be the case, from the left side of the body being weaker than the right, which may account for the former being more prone to some particular diseases than the latter.

Enlargement of the middle or third lobe, which was, I believe, first described by Sir Everard, usually offers the most complete obstruction to micturition, forming a tumour projecting into the bladder of merely a small nipple-like process behind the internal urethral orifice, or it may attain the size of a small pear or apple. Although hypertrophy of the middle lobe usually forms the greatest impediment to micturition, yet, in many instances of enlargement of the lateral lobes, the urethra is so completely blocked up as greatly to interfere with, if not entirely to obstruct, the egress of urine from the bladder.

When the prostatic enlargement is considerable, the urethra becomes elongated, usually flattened and tortuous, having its natural curve close to the bladder greatly increased. When the projection is formed by the left lobe, the urethra will be pushed to the right side, and in an opposite direction, should the right be affected. In hypertrophy of the middle lobe the urine escapes from the bladder by two channels, one passing on each side of the tumour. It is necessary to bear in mind these occasional deviations of the normal course of the urethra when introducing the catheter.

The chronic enlargement of the prostate is usually caused by an excess of nutrition—from an increase of the natural elements of the gland. Mr. Adams observes, that "when examined by the microscope, its blood-vessels will be found numerous and large; its ducts and follicles are immensely increased in diameter; they are loaded with concretions, and there is a remarkable increase in the deposit of the white fibrous and muscular elements which fill up the spaces between the follicles. Occasionally we find large tumours developed in the lobes analogous to the fibrous tumours which occupy the female breast, and which are constituted of a genuine hypertrophy of the glandular tissue. Sometimes the enlargement depends on the growth of distinct oval and circumscribed tumours growing within the gland."

When the hypertrophy is considerable, the gland is usually more or less indurated, sometimes so much so as to possess the consistence of the fibrous tissue: hence its occasional description as scirrhous prostate. In many instances, however, the enlarged gland has been found much softer than natural. Ulceration in some portion of the affected lobe is of no uncommon occurrence, and greatly adds to the sufferings of the patient.

Sir B. Brodie has remarked, that "it is not uncommon, on making a section of an enlarged prostate gland, to find in its substance several small collections of a muco-purulent fluid, having the appearance of pus mixed with the natural secretion of the gland. Sometimes there is a distinct abscess, which attains a very considerable size, presenting itself, at last, in one or another situation, according to circumstances."—*Opus cit.*

Hypertrophied prostate, although an occasional, is, I think, by no means so frequent a complication of urethral stricture as has been generally supposed. In but very few comparatively of the instances of senile hypertrophy within my own experience has

there been a permanent stricture. If, as asserted by Sir Everard Home and others, that stricture of the urethra greatly tends to the production of hypertrophy of the prostate, the two diseases would surely be found more frequently associated. In elderly persons who have for many years been affected with stricture of the urethra, we find that occasionally hypertrophy of the prostate may be added to the previous disease; but I do not think we have any evidence to prove that the latter has had any influence in the production of the former.

The pains in the rectal, inguinal, and lumbar regions, with the various painful sensations affecting the penis, arising from irritation of the pelvic nerves, cannot be depended upon as diagnostic marks in the complication of hypertrophied prostate with urethral stricture any more than can the offensive ammoniacal smell of urine, as these symptoms are equally significant of either disease.

If an increased difficulty in micturition, or an incontinent dribbling of urine, should occur in patients advanced in life affected with urethral stricture, no time should be lost in ascertaining, by the introduction of the catheter, whether they possess the power of completely emptying the bladder. If urine, however small in quantity, be found in the bladder immediately after micturition, an elastic-gum catheter without its stylet, if it can be passed, should be introduced once or twice daily, to prevent the irritation caused by continued retention of acrid urine. If an elastic catheter cannot be introduced, a silver one must be used, but the former is preferable, as being productive of less irritation. Before using a silver instrument, however, the elastic-gum catheter should be tried with its stylet.

In cases of enlarged prostate, Sir E. Home found that, when the catheter was stopped by the tumour, he was often successful in the introduction of the instrument by withdrawing its stylet for about two inches, which had the effect of tilting its point over the obstruction.

Should the bladder sufficiently recover its power to evacuate the whole of the urine, the introduction of the catheter must, of course, be discontinued, and the stricture kept open by the occasional use of the bougie, which should be passed merely through the obstruction, so that the prostate may not be unnecessarily irritated.

If much difficulty be experienced in the introduction of the catheter, it should be retained for a few days, and stopped with a wooden plug, which is to be taken out whenever the patient desires

to pass his urine. By the retention of the catheter for a few days, relieving the enlarged prostate from the irritation caused by acrid urine in the bladder, a diminution of the tumefied gland will probably ensue, and the patient may recover the power of complete micturition; or should there be still partial retention, catheterism may then be effected without difficulty. When ulceration occurs in the enlarged prostate, the sufferings of the patient are often most acute from violent spasm of the bladder in the expulsion of the last few ounces of urine. Enlargement of the prostate seldom goes on to any considerable extent without causing inflammation of the vesical mucous membrane, which then secretes a viscid offensive mucus, thus adding to the pre-existing inflammation. The effects of enlarged prostate upon the bladder are particularly described under the heads of "Cystorrhœa," and "Sacculated Bladder."

In the advanced stage of prostatic hypertrophy, the bladder becomes thickened and incapable of containing more than from four to eight ounces of urine; although, occasionally, its retentive capacity is greatly increased. Sir B. Brodie observes:—"In all cases of enlarged prostate, in which the disease is allowed to take its own course, the muscular tunic of the bladder becomes increased in thickness and strength. The reason of this is obvious. The bladder has been called on to make unusual efforts; and all muscles under these circumstances acquire an increase of size. The mucous membrane frequently becomes protruded through the triangular spaces between the muscular fibres, forming pouches or cysts similar to those which I have already mentioned as occurring in neglected cases of stricture of the urethra."—*Opus cit.*

The pressure of the enlarged prostate upon the rectum may interfere with the due performance of the functions of that bowel, causing a difficulty in the evacuation of its contents, a sense of weight or bearing down, and sometimes a distressing tenesmus.

There can be no doubt that the great remedial measure in this affection, for which we are indebted to Sir E. Home, is the regular introduction of the catheter as long as requisite, to prevent the irritation arising from retention of offensive mucus and urine. The occasional abstraction of blood, by cupping on the loins, or by leeching the perineum, has proved useful in some instances. The horizontal position should be adopted whenever there is much irritation. The bowels should be kept gently open.

The following mode of proceeding in the use of the cat

with patients suffering from a partial retention of urine from enlarged prostate, is described by Sir B. Brodie, who observes:—"The immediate effect of drawing off the water is to give the patient the greatest comfort. He loses the irritation which tormented him before; he is free from pain, and is no longer harassed by the incessant desire to make water. But the relief is only temporary. In a few hours the bladder is again loaded, and the symptoms return. The catheter is then to be introduced again; and you must continue to introduce it at regular intervals. These intervals will vary in different cases. One patient is quite comfortable if the urine be drawn off twice in the twenty-four hours, while another requires it to be done every six or eight hours. I never, except under peculiar circumstances, recommend the catheter to be used oftener than this. If employed six or eight times in the day and night, it is likely to irritate the prostate, and to do harm instead of good. This plan is to be pursued probably to the end of the patient's life. It may be distressing to him to be thus dependent on the use of the catheter, but it is the least of two evils. The repeated introduction of the catheter is an inconvenience, but it prevents misery and destruction. Without it, slow inflammation of the mucous membrane of the bladder extending along the ureters to the kidneys will supervene; abscess will form in the prostate, and probably stone in the bladder. But where the catheter is used regularly, these evils are at any rate delayed for a considerable time, and in by far the greater number of cases are prevented altogether. Let the patient learn to introduce the catheter for himself."—*Opus cit.*

If in the retention from enlarged prostate it be found impossible to introduce a catheter, which will very rarely be the case when in skilful hands, there are only two other modes of proceeding that can be adopted for the patient's relief. The bladder must either be punctured above the pubes, or the point of the catheter forced through the enlarged prostatic lobe, when the instrument should be left in the bladder for a few days, so that the artificial channel may become sufficiently consolidated for the subsequent evacuation of the urine.

As no internal medicine that I am aware of has yet been discovered capable of reducing an hypertrophied prostate, the medical treatment must be directed to the removal or mitigation of its effects, which are noticed in their proper place. I believe that the injection of a pint of cold water into the rectum every

morning, as recommended by Sir E. Home, will prove useful, by retarding its progress, particularly in the early stage of the disease.

In every case of enlarged prostate, an examination should be made by the introduction of the finger into the rectum; for, although hypertrophy of the middle lobe cannot be detected in that manner, useful information may be obtained as to the extent of enlargement of the lateral lobes. When hypertrophy of the prostate gland is added to stricture of the urethra, on the introduction of a bougie sufficiently small to go through the latter, it will be found that the point of the instrument, when it arrives at the neck of the bladder, will be bent against the enlarged gland. The causes predisposing to this disease have usually been considered such as are most productive of general plethora, and more particularly of the genital organs, such as too free indulgence in the pleasures of the table, excessive venery, and riding on horseback.

Chronic enlargement of the prostate has very generally been considered a natural occurrence in old age. Some surgeons, however, have regarded this affection as the result of disease, and not as an almost essential accompaniment of advanced life. It is curious to contrast the opinions of two highly eminent and experienced surgeons upon this point. Sir B. Brodie observes: "When the hair becomes grey and scanty, when specks of earthy matter begin to be deposited in the tunics of the arteries, and when a white zone is formed at the margin of the cornea,—at this same period the prostate gland usually, I might perhaps say invariably, becomes increased in size." Mr. Guthrie has told us, that "a great mistake had been previously committed, and indeed now continues, that an enlarged prostate is a very common disease of old men, and particularly of the part called its third lobe. The point, I am happy to say, has of late been closely investigated by the surgeons of the Royal Naval Hospital, Greenwich; and Sir John Liddell, Dr. Beith, and indeed all of them assure me, that on the examination of the bodies of most of the old men who die there,—and from two to three hundred, or more, die annually of old age,—the enlargement of the prostate, and especially of the third lobe, is not commonly found in them."

For the information of those interested in this subject, it may be as well to state that, according to Mr. Adams, "a healthy prostate weighs five or six drachms." My own comparatively limited post-mortem observations lead me to conclude, that

amongst the poor, hypertrophied prostate is by no means a constant accompaniment of old age, whatever it may be with the rich, who are more exposed to its exciting causes, such as riding on horseback, high living, and other indulgences. It is probable that the truth will be found somewhere between the two extreme opinions recorded; and should it be my lot to attain advanced life, I shall endeavour to console myself with the opinion of my late excellent friend, Mr. Guthrie, and not fancy that, to the various other infirmities of age, must necessarily be added an enlarged prostate.

The following highly important practical observations of Sir B. Brodie, on the management of the catheter in retention from hypertrophy of the prostate, are of great practical value:—"When the catheter has entered the bladder, and the urine is evacuated, you must pursue one of two courses: either allowing it to remain in the urethra and bladder, secured by a proper bandage, and with a peg in the orifice, so that the patient may relieve himself whenever he has a desire to void his urine; or withdrawing it, and re-introducing it as soon as the bladder becomes again distended. Now, I do not mean to lay it down absolutely as a rule, that you should allow the catheter to remain, but I am certain that it is prudent to do so in the great majority of cases. If you remove it, so abundant is the flow of urine which immediately takes place from the kidneys, that you will find the bladder again distended, and requiring the re-introduction of the catheter, within five or six, perhaps even within three or four hours. It will be necessary to use the catheter again, after another short interval; and it will not unfrequently happen, although there has been no difficulty in the first introduction of it, that there is considerable difficulty afterwards.

"You avoid all this by leaving the catheter in the bladder; and there is another advantage in this mode of proceeding. The prostate gland is kept in a state of more complete repose, and in one much more favourable to recovery, so far as recovery can take place, than it would be in, if irritated by repeated introduction of the instrument.

"After the catheter has remained in the urethra for some days, you may withdraw it; and if the patient is now able to empty his bladder by his own efforts, it may be laid aside altogether; otherwise, it must be regularly introduced once or twice in a day, or oftener, according to circumstances. Where the enlargement of

the prostate and retention of urine have come on suddenly, the patient generally regains the power of emptying the bladder in the course of three or four weeks, and sometimes much sooner; but where the disease has come on gradually, he never regains it completely. In the former case he may be liable to a recurrence of the retention of urine, at longer or shorter intervals; but in the latter he is more or less of an invalid ever afterwards."

The following observations of Sir B. Brodie are important:—"Yet, however necessary it may be in all cases, there are some in which much discretion is required in resorting to the use of the catheter.

"If, in a case of chronic enlargement of the prostate, the patient has been allowed to go on for two or three years, or longer, without the use of the catheter, and, in consequence of this neglect, the quantity of residuary urine in the bladder has gradually increased, so that at last one, or two, or more pints are accumulated in it, the kidneys having at the same time become diseased, the introduction of the catheter, according to the rules formerly laid down, so as to empty the bladder two or three times daily, is likely to be injurious rather than beneficial."

Sir Benjamin alludes to the consequences of the operation of lithotomy performed on a person who labours under any considerable disease of the kidneys, and remarks, that "the resemblance between the effects produced by the use of the catheter in the way and under the circumstances which I have endeavoured to describe, and those which follow the operation of lithotomy in a patient similarly circumstanced, is too obvious to be overlooked; and I conclude that they are to be referred to a common principle. The system suffers from the shock of the operation in one case, and in the other case it suffers in the same manner from the impression made on it by the distended bladder, and consequent removal of the pressure which is made through the medium of the dilated ureters on the glandular structure of the kidneys." Sir Benjamin advises, under these circumstances, that "the catheter should be introduced at first so as to draw off only a portion of the contents of the bladder, and that several days be permitted to elapse before it is completely emptied; care being taken, at the same time, to uphold the general health by the exhibition of ammonia, quinine, and other tonics, exhibited according to circumstances, and combined with the prudent use of wine or brandy, and a plain nutritious diet."—*Opus cit.*

As the posterior portion of the urethra becomes considerably elongated in many cases of enlarged prostate, the catheters used for retention of urine in that disease require to be longer, and to have a greater curvature than the ordinary instruments.

It may be useful to quote the opinions of some of our greatest practical surgeons with regard to the proper instrument to be used, as well as the best manner of proceeding in cases of retention of urine from enlarged prostate.

Sir B. Brodie, in his Lectures on the Urinary Organs, observes: "I rarely use any instrument but the elastic-gum catheter. It gives you more trouble to learn the use of the gum catheter, and to become dexterous in the management of it, than it does to learn the use of the silver catheter. When, however, you have once become familiar with the gum catheter, you will generally prefer it to the other; and there is always this advantage in it, that when you have succeeded in introducing it into the bladder, it may, if necessary, be allowed to remain there. A gum catheter may be retained in the urethra and bladder with very little inconvenience to the patient, which is not the case with a silver catheter.

"As Sir Everard Home observed:—'The gum catheter may be used in two ways: without a wire or stylet, when it is a flexible instrument; or mounted on an iron stylet, in which case it is inflexible. You should be provided with a number of gum catheters, mounted not on small flexible straight wires, like those sold by the instrument makers, but on strong iron stylets, having the curve of a silver catheter. The stylets which belong to the larger gum catheters should have flattened iron handles, resembling that of a common sound. Let your gum catheters be kept thus prepared for a considerable time before they are wanted for use. They will then become fixed in their proper curvature. With the stylet, such a catheter is as inflexible as if it were made of silver; without it, it is capable of retaining its shape to a certain extent, still being flexible.'

"I always begin with passing such an instrument as the first. If the gum catheter, without its stylet, will enter the bladder, it is so much the better. It gives the patient no pain; it is incapable of lacerating the urethra, or producing hæmorrhage; it may do all that is required, and it can do no harm even in a rough hand. If you fail in introducing it, the failure will not make it more difficult to pass another instrument afterwards. In difficult cases,

indeed, the gum catheter without the stylet will not succeed. You must then use your gum catheter mounted in the way which I have already explained.

"You ought not to use a catheter so large as to give pain; but for the most part you will find one which is large enough to fill the urethra, without stretching it, to be more easy of introduction than a smaller one. A very small catheter approaches to a pointed instrument, and the extremity of it is liable to become entangled in the tumour of the prostate. The stylet ought to be considerably curved. The reason of this is obvious. The tumour which projects into the bladder, and which affords the principal obstruction to the catheter, is situated at the posterior part of the inner orifice of the urethra. A catheter which is slightly curved, comes directly in contact with this tumour. In a catheter which is much curved, the point is directed forward towards the pubes; and it avoids the obstruction behind. Always bear in mind, in introducing the catheter, that it is to be used with a light hand. It should be held, as it were, loosely in the fingers. It will then in a great measure find its own way, in that direction in which there is the least resistance. If you grasp it firmly, it can go only where you direct it, and it is liable to puncture and lacerate the membrane of the urethra, and the substance of the prostate, and to make a false passage instead of entering the bladder."—*Opus cit.*

The following are the observations of the late Mr. Liston relating to this subject:—"Retention when the prostate is enlarged, can in general be readily relieved if a proper instrument be used; in many such cases, the bladder cannot possibly be reached with catheters of ordinary length. The prostate catheter should be made of silver, and at least three inches longer than those employed for other purposes; the beak should be long, and the curve considerably greater. The careful employment of such an instrument will generally be followed by a successful result; whereas attempts with short and elastic catheters must almost certainly end in disappointment to the practitioner and great injury to the patient. Innumerable cases have been presented to me in which for days persevering attempts have been made to relieve an over-distended bladder; nothing but blood, and that in abundance, has flowed. It has been imagined that the bladder was full of blood, and means have been employed, such as exhausting syringes and injections of warm water, to break down and

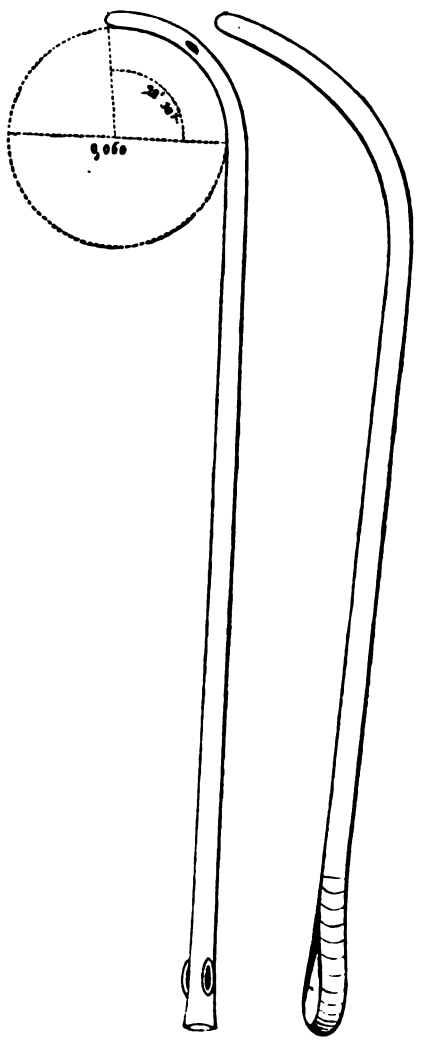
extract the coagula supposed to exist. A long catheter has been at last used with the effect of freeing the bladder of many pounds of high coloured urine, but nothing else."

"Should it so happen that great opposition is offered to the introduction of the catheter through the gland, it is generally the posterior and prominent part that comes in the way. It will remain for the surgeon to determine whether he will attempt to reach the cavity by puncture through the natural passage, or by tapping above the pubes. The puncture of the rectum is here inadmissible, from the anatomical relations of the parts in their altered state. The puncture above the pubes is always attended with great danger from infiltration. The projecting part of the gland can be readily perforated, and without hazard. It is better to do so with a stilette, carried through a slightly curved and long canula, the point of which, by examination through the rectum, is ascertained to be firmly and deeply lodged in the prostatic portion of the urethra, than by the catheter."

"The punctures of the bladder are operations unattended with difficulty, though fraught with danger; many are the victims that have been bungled out of their lives by the injudicious and awkward use of catheters, and by the ill-timed and imprudent recourse to perforation of the bladder. These operations have been, and are still, much more frequently performed than there is any occasion for. I have as yet met with but one case in private, and that a very peculiar one, in which the opening of this viscus seemed to be indispensable."—"*Practical Surgery.*" *By Robert Liston.* 1837.

The following observations are those of the late Mr. Guthrie relating to the introduction of the catheter in hypertrophy of the prostate:—"When the patient has an enlarged prostate, and the urethra behind the triangular ligament is lengthened as well as altered in its direction, the catheter should have a different shape from the common one. It ought to be fourteen inches long, a No. 12 in size, quite round at the point, with small round holes at the sides of the end, and with a large curve. It should be passed down to the obstacle for the purpose of ascertaining the distance only. This being done, it is to be withdrawn a little; and as the patient lies on his back, with his legs drawn up, the shoulders being a little supported, the point is to be hooked beneath the pubes, the shaft of the instrument making a right

angle with the body. The surgeon now makes his calculation, not as to how many inches, but as to the exact situation of the point



EXPLANATION.

The figure on the left represents Civiale's catheter, and the figure on the right the English instrument.

x 2

of his instrument, which should be just entering the membranous part, and yet be past the triangular ligament, and so far clear of the bone, although hooked against it, that it will, on depressing the handle of the catheter, carry the upper surface of the urethra as near as may be against the inner surface of the pubes, and by this manœuvre ride over the enlarged prostate, which does not generally surround the upper part of the urethra, and therefore admits of this being done. To do this, the concave, or upper surface of the catheter must be firmly applied to the under surface of the pubes, from which position it slips upwards, or towards the wall of the abdomen, as the handle is depressed. If the point be allowed to advance without, by quitting the pubes, it will only get into the bladder by passing through the substance of the prostate, which sometimes happens, and does less mischief than might be supposed, as it is frequently only discovered after death." —*Opus cit.*

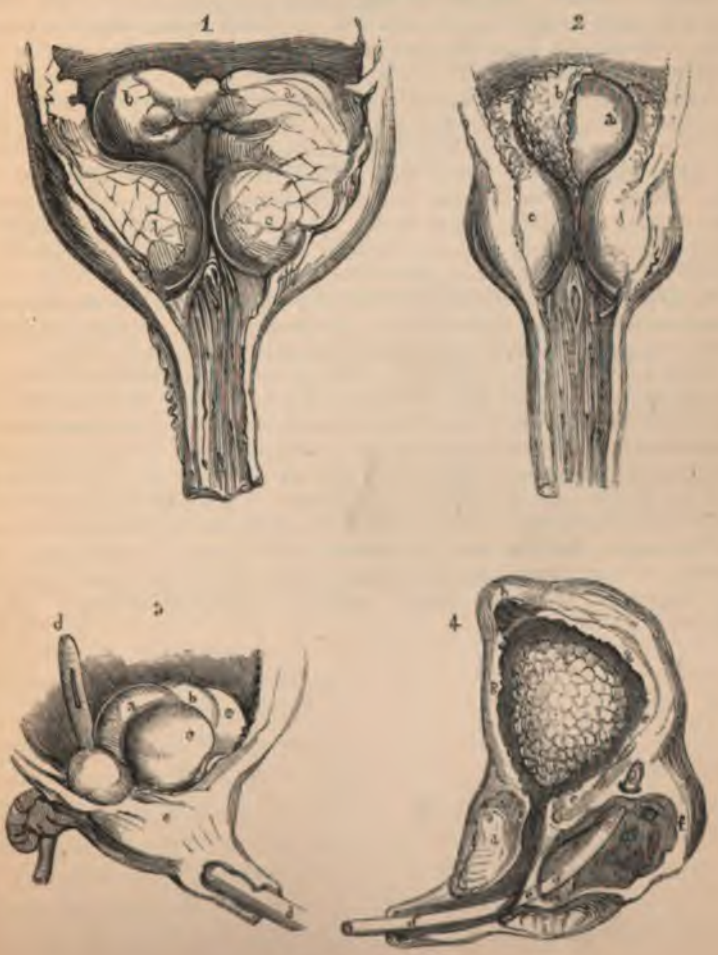
The prostate catheter used by Civiale differs from that employed by English surgeons, in having a shorter curve. Civiale observes, "Je dois faire, pour les algalies et les sondes flexibles, dont je me sers dans les cas de tuméfaction prostatique, et de lésions du col et du corps de la vessie, ce que j'ai fait pour la sonde à dard, c'est-à-dire déterminer rigoureusement la courbure dont l'expérience m'a confirmé les avantages. Rien de plus facile. L'instrument se compose de deux parties, l'une droite, et l'autre courbe. La première aura une étendue de vingt-quatre centimètres. Pour trouver la longueur et le degré de courbure de la sonde, il suffit de tracer sur le papier un cercle de 60 millimètres de diamètre; aux trois onzièmes de la circonférence duquel la partie concave de la sonde doit s'adapter exactement." (See Plate; which represents the short curved catheter of Civiale, and that which is commonly used by English surgeons.) It will be seen that some of our highest authorities on this subject have not exactly agreed as to the particular form and kind of prostatic catheter which is likely to prove most useful.

It can readily be supposed that each surgeon will handle most dexterously that shaped catheter to which he has been accustomed. There can be little doubt, however, that successful catheterism depends much more on the skill of the operator than upon the particular form of the instrument which he employs.

In my own practice, I have adopted the method recommended by Sir B. Brodie; but have sometimes succeeded in the introduc-

of the silver prostatic catheter, after having failed with the elastic-gum instrument, both with and without its stylet. In case of failure with the catheter commonly used, I should certainly try the one recommended by Civiale.

When retention of urine occurs from enlargement of the prostate complicated with stricture, the difficulties of catheterism increase in proportion to the narrowness of the urethral obstruction. In some cases these difficulties may probably be so great as to render it impossible to relieve the patient without resorting either to the puncture of the bladder, or to division of the stricture.



EXPLANATION OF THE PLATE OF ENLARGEMENTS OF THE PROSTATE GLAND.

Figure 1 "exhibits the lobes of the prostate greatly increased in size. The part *a*, *b*, girds irregularly, and obstructs the vesical outlet, while the lateral lobes, *c*, *d*, encroach upon the space of the prostatic canal. The walls of the bladder are much thickened."

Figure 2.—"The three lobes, *a*, *b*, *c*, of the prostate are enlarged, and of equal size, moulded against each other in such a way that the prostatic canal and vesical orifice appear as mere clefts between them. The three lobes are encrusted on their vesical surfaces with a thick calcareous deposit. The surface of the third lobe, *a*, which has been half denuded of the calcareous crust, *b*, in order to show its real character, appeared at first to be a stone impacted in the neck of the bladder, and of such a nature it certainly would seem to the touch, on striking it with the point of a sound, or other instrument."

Figure 3.—"The prostate presents four lobes of equal size, and all projecting largely around the neck of the bladder. The prostatic canal is almost completely obstructed, and an instrument has made a false passage through the lobe *a*."

Figure 4.—"The lower half, *c*, *b*, *f*, of the prostate having become the seat of abscess, appears hollowed out in the form of a sac. This sac is separated from the bladder by a septum, *e*, *e*, the proper base of the bladder, *g*, *g*. The prostatic urethra, between *a*, *e*, has become vertical in respect to the membranous part of the canal, in consequence of the upward pressure of the abscess. The sac opens into the urethra near the apex of the prostate, at the point *c*; and a catheter passed along the urethra has entered the orifice of the sac, the interior of which the instrument traverses, and the posterior wall of which it perforates. The bladder contains a large calculus, *i*. The bladder and sac do not communicate, but the urethra is a canal common to both."—"*Surgical Anatomy*." *By J. Maclise, F.R.C.S.*

CHAPTER XXII.

IRRITABILITY OF THE BLADDER—SPASM OF THE BLADDER—CALCULUS IN THE BLADDER.

This is often a most annoying effect of strictured urethra. In the natural state, under ordinary circumstances, the urine is excreted from four to five or six times in the twenty-four hours, the quantity varying from thirty to forty ounces; rest during the night being seldom disturbed for the purpose of micturition. It is far otherwise in aggravated cases of stricture, when such is the irritability of the bladder that there is frequently an irresistible desire to void the urine every hour, or oftener, during the day, and perhaps nearly as often in the night. The immediate cause of the irritability in these aggravated cases is, I believe, dependent more or less on inflammation of the lining membrane of the bladder, as the urine usually contains a portion of viscid mucus.

In persons of high nervous susceptibility, an irritable state of bladder sometimes occurs in the earlier stages of stricture, when the urethral irritation may not only affect the bladder sympathetically, but also the kidneys, exciting these organs to augmented secretion, thus increasing the number of micturitions, as well as the quantity of urine voided. The principal attention of the surgeon should, of course, be directed to the stricture, for the vesical excitement commonly decreases as the stricture becomes widened, the irritability of the bladder entirely subsiding on, or before, the complete removal of the urethral obstruction, unless from long continuance of the disease irremediable organic mischief has occurred in the kidneys or bladder. Upon this subject Dr. Prout observes:—"Another fertile source of irritable bladder, and indeed of a great deal of mischief, not only in that organ and its appendages, but even in the kidneys themselves, is stricture of the urethra. The management of this falls entirely within the province

of the surgeon; and as long as the stricture remains nothing can be done towards alleviating the patient's sufferings. The first object of the surgeon, therefore, will be to remove all mechanical obstruction from this organ, and very often when that is accomplished, every symptom will vanish, that is to say, provided the bladder and kidneys have not become organically affected."

Much, however, may be done to assist the mechanical part of the treatment, especially by the introduction into the rectum at bed-time of opium suppositories, consisting of two grains of opium, or ten grains of the soap and opium pill; or of an injection of forty or fifty drops of laudanum in two ounces of thin starch or gruel. Relief will also be afforded by keeping the urine in a healthy state, so that it may be as little irritating as possible. If the urine be too acid, from ten to twenty drops of liquor potassæ, with the same quantity of tincture of hop, in an ounce of camphor mixture, should be taken two or three times daily; or, if it be too alkaline, acids should be prescribed—the nitro-muriatic is probably the best—to which may be added a few drops of tincture of opium. When the urine is acid, and causes more or less sense of heat during micturition, the addition of ten or twenty drops of the wine of colchicum may prove an useful addition to the alkaline mixture previously noticed, especially if there be any gouty disposition in the patient. The propriety of attending strictly to the urine in these cases must be evident, as it is well known that an unhealthy condition of that fluid is of itself often sufficient to keep up an irritable state of the bladder; as is sometimes also a disordered state of the stomach and bowels, which indicates the necessity of paying attention to those organs. The diet and general treatment should be antiphlogistic, unless the urine deposits the phosphates freely, when it will be necessary to allow a more generous regimen.

Persons predisposed to gout, when affected with stricture, are peculiarly liable to irritability of the bladder, caused by an acid state of the urine. In such cases the class of remedies usually found most efficient in the removal of that state of the constitution most favourable to the occurrence of gout, should be exhibited, whilst at the same time attention must be paid to the local disease.

SPASM OF THE BLADDER.

The spasmodic action or painful contractions of the muscular coat of the bladder upon its contents must be familiar to all who

are accustomed to the treatment of the more severe forms of urethral obstruction. In highly contracted strictures, where the difficulty of micturition is great, the principal suffering of patients is evidently caused by the frequently recurring spasmodic efforts of the bladder to propel its contents through an extremely narrow rigid channel. That the most painful sufferings arise more from spasm than from mere distension of the bladder, is evident from the periodic occurrence of the severe paroxysms of pain. If it be asked, why the contractions should not be persistent as long as the vesical distension continues, the law of alternate contraction and relaxation, by which muscular action is governed, is a sufficiently satisfactory answer to the question. This alternation of contraction and relaxation of muscular action also accounts for the inability of a patient with a tight stricture completely to empty his bladder at one effort of micturition. When watching patients who suffer from considerable difficulty of micturition from urethral stricture, it will be observed that the urine is discharged only in small quantities at a time, as if the bladder were unable to continue but for a very short period the powerful contractions requisite for the expulsion of its contents through a highly obstructed channel. The same phenomena of alternate relaxation and contraction are often observed in spasmodic affections of the intestinal canal, arising from obstruction to the passage of its contents in some part of that tube. That distension of the bladder is the cause of the spasm there can be no doubt, from the immediate mitigation of suffering obtained by the evacuation of only a small quantity of its contents. The retentive capacity of the bladder is often greatly diminished in cases of long continued urethral obstruction, so much so, that it may probably be incapable of containing more than three or four ounces, or not even that quantity, without the patient feeling an urgent desire of micturition, although, in its healthy state, it will usually contain from half a pint to a pint, or even more, and no uneasy sense of distension be experienced. It is evident, therefore, that the severity of the spasms in cases of difficult micturition is no proof that a large quantity of urine is contained in the bladder, but merely that the organ is distended beyond its capacity for retention without inconvenience.

Spasm of the bladder may of course be produced by other causes than stricture of the urethra; the most common of which is the presence of a stone in the vesical cavity. Spasm may also be produced by ulceration, by fungoid tumours, or other organic

mischief of the bladder; also by disease of the kidneys, enlarged prostate, irritating diuretics, &c. In this affection there is pain in the region of the bladder, extending, especially in obstruction of the urethra, along that tube, being often accompanied with very painful erections.

For the temporary relief of spasms of the bladder, dependent upon stricture of its excretory canal, opium is the remedy of most value, and it is often requisite to exhibit that drug in rather large doses, as has been previously noticed in the treatment of retention of urine. Nauseating doses of tartarised antimony may often be usefully combined with opiates in these cases. Next to opium, as a valuable remedial agent in spasm of the bladder, is, I believe, the hot bath. The above remedies, however, can only be regarded as affording temporary relief to the sufferings of the patient, as the only means of entirely preventing the recurrence of the spasms is by widening the obstructed passage upon which they depend. The method by which the latter object can best be accomplished has been previously noticed in the treatment of stricture.

CALCULUS IN THE BLADDER.

This disease is occasionally associated with stricture, and there is usually but little difficulty in detecting the complication from the greater suffering, and from the peculiar symptoms of vesical calculus being added to those of urethral obstruction. If a patient with a constricted urethra should sometimes void bloody urine, especially when there exist other symptoms of stone, it will, of course, be desirable to sound the bladder as soon as possible. If, as the stricture becomes widened, the difficulty and pain in micturition should not gradually subside, and there be no improvement in the stream of urine, the operation of sounding must not be unnecessarily delayed.

In general, however, the symptoms of stone will be so well marked, notwithstanding the existence of stricture, that the complication will be soon detected. The irritation produced by a calculus upon the neck of the bladder is apt, at times, to extend to the membranous portion of the urethra, exciting contraction of its surrounding muscular fibres, causing a spasmodic stricture. This may, probably, lead to the error of mistaking a case of stone in the bladder for one of stricture. A few years ago, I was consulted by a gentleman, twenty-seven years of age, residing in the country, who was supposed to be suffering from a strictured urethra, having

for more than a year been treated for that disease by two surgeons. I was informed by the patient that for some length of time a No. 11 bougie had been regularly introduced into his bladder, but without any mitigation of the distressing symptoms. I at once examined him with a No. 11 sound, which was slightly grasped at the membranous portion of the urethra, and readily detected a stone, which, after a little preparation of the patient for the proceeding, I crushed with Weiss' screw lithotrite. The calculus was of a tolerable size, requiring eight operations completely to clear the bladder. Nearly two drachms and a half of detritus were collected. I heard of this gentleman four years after the operation, when he had no symptoms of either stricture or stone. I think there can be little doubt that in this case the stricture was merely spasmodic, the result of irritation produced by the calculus.

When the sufferings arising from stone are added to those of stricture, it is, of course, very desirable to free the patient from the former as soon as possible, and the obstruction should be as rapidly dilated as can with safety be effected. Under these circumstances, as previously observed, I think that Mr. Holt's dilator may be advantageously employed, should the stricture be too contracted to admit the introduction of a tolerable sized sound.

As Civiale's experience in the treatment of the complication of vesical calculus with urethral stricture is probably greater than that of any other writer on these diseases, I shall quote the more important of his observations relating to the subject:—

"When the calculus is small and the stricture but little contracted, lithotrity may be had recourse to with advantage as soon as the contraction of the canal is sufficiently enlarged for the introduction of the instruments and for the passage of the calculous fragments. In a great number of cases I have found this mode of proceeding perfectly successful. It consists in treating the stricture at first as if there were no complication of vesical calculus, and the curative treatment of the contraction becomes the preparatory treatment of lithotrity."

"When there exists an obstinate, organic, and especially a very retractile stricture, I sometimes have recourse to retention of the catheter. As soon as sufficient dilatation is effected, I remove the catheter and proceed to the performance of lithotrity. I reintroduce the catheter immediately afterwards. The expulsion

of the calculous fragments is slow and difficult, the little pieces (*débris*) can only pass through the eyes of the catheter, and for the remainder it is necessary to proceed to the artificial extraction of the fragments, as is done in cases of paralysed bladder. The treatment for the stone is thus prolonged, but there are no accidents. If the patient cannot bear the retention of the catheter for three or four weeks, the system must be changed."

"In many cases the practice of internal urethrotomy efficiently, before proceeding to the destruction of the stone, is a resource which I have found useful, with this condition always understood, that before practising lithotrity the stricture must be completely cured. Without this precaution the manipulations of lithotrity, and the passage of calculous fragments, excite irritation in the lining membrane of the urethra, and tend to the reproduction of the stricture."

"In more serious cases, from the size and hardness of the stone, as well as the extent of the contraction, the conduct of the practitioner may become perplexing. It may even happen that the patient, whom the surgeon had hoped to cure by lithotrity, finds that after diverse useless trials of that operation, he is at last forced to submit to lithotomy."

"In some yet more serious cases, especially from the complications which have occurred under the combined influence of the stone and of the stricture, it will be necessary to have recourse immediately to lithotomy, notwithstanding the difficulty which these cases often present. It is a means of putting an end at once to the horrible sufferings of the patients—it is a necessity to which it is necessary to submit, as there will be danger in temporising." When practicable, Civiale considers that the stricture should always be dilated before proceeding to the removal of the stone, and observes, "If it is necessary, after lithotomy, to destroy the urethral contraction, why not begin with that proceeding whenever it is possible?"—*Opus cit.*

CHAPTER XXIII.

SPERMATORRHŒA—INVOLUNTARY SEMINAL EMISSIONS.

Nocturnal emissions are not unfrequent complications of urethral stricture, often causing great mental depression, and more or less exhausting the strength of the sufferer. It is in strictures at the bulbous portion of the urethra that these emissions mostly occur. Persons who have naturally an irritable urethra, when afflicted with stricture, are more predisposed to spermatorrhœa than those in whom the urethral canal is less sensitive.

The immediate cause of these pollutions may be either an extension of inflammation to the ejaculatory ducts, or the emissions may result merely from the participation of the seminal organs in the irritability of the stricture. A patient of mine who had long suffered from an impassable stricture, with two false passages, when I first saw him, was affected to such a degree with involuntary emissions, that frequently two or three occurred nightly, and if he slept for an hour in the day an emission was almost sure to happen, by which he was reduced to a state of extreme debility. The spermatic discharges gradually diminished as the stricture yielded to dilatation, and by the time a No. 9 sound could be passed into the bladder they had entirely ceased.

Spermatorrhœa when caused by stricture is very different to that which results from masturbation. The former seldom continues long after the removal of the urethral obstruction, whilst the latter, when arising from atony of the seminal organs, often proves very difficult to cure, remaining long after the cessation of the unfortunate habit from which it originated.

A discharge of a considerable quantity of vitiated glairy mucus, immediately after an evacuation of the bowels, especially when accompanied with much straining, is very commonly mistaken for

spermatorrhœa, and sometimes causes great mental depression. There can be little doubt that these discharges are generally merely an augmented prostatic secretion; or they may consist partly of the contents of the seminal vesicles, which there is, I think, good reason to believe, are not, as has frequently been supposed, receptacles for the accumulation of semen. Most certainly, these prostatic vesicular discharges have not the debilitating effect of true seminal emissions. In many such cases I have been unable to detect, by careful microscopic examination, any spermatozoa in the mucus which had been discharged after defecation. In some instances, however, these prostatic gleets are complicated with occasional seminal emissions.

Lallemande remarked, that "Impotence, when not attributable to any evident cause, must be considered a local symptom, and one of the most certain of involuntary seminal emissions." A microscopic examination should be made of the discharges which occur after defecation whenever any doubt exists regarding their true nature.

When spermatorrhœa is the result of stricture, the cure of the latter is usually that of the former. When, however, the former has existed previous to the occurrence of the latter, the seminal emissions may persist long after removal of the urethral obstruction. The complication of spermatorrhœa with stricture, and a highly irritable state of the urethra, often proves very troublesome, and requires great care and gentleness in its treatment. Such strictures are, in fact, not unfrequently caused by masturbation.

When the spermatorrhœa resulting from stricture consists merely of occasional nocturnal emissions, it is seldom of a serious character; but it is far otherwise in cases where the discharges occur in the day, as well as night; for then, the general vital powers of the system become considerably exhausted, and, if unchecked, are likely to induce incurable organic disease.

According to my experience, it is mostly a mild form of spermatorrhœa which is caused by stricture. The more serious cases of seminal emissions are undoubtedly brought on, I might say, in ninety-nine cases out of a hundred, and should not far exceed the truth, by a long persistence in the habit of self-abuse.

The treatment of spermatorrhœa must be regulated by its cause and effects. When complicated with stricture, the first object should be to dilate the obstruction with as much gentleness as possible; and when that is effected, should the emissions

continue, other remedial measures must be employed. These are of two kinds, constitutional and local.

As the sufferers from the more aggravated forms of spermatorrhœa are but too often the victims of an unprincipled gang of swindlers and charlatans, it is desirable that the former should know at once that there exists no *specific* remedy for this disease.

The constitutional remedies which have proved most useful in spermatorrhœa, are the different kinds of tonics, exhibited either singly, or in combination. The various preparations of quinine and iron, are those which have been most frequently employed in spermatorrhœa. The citrate of iron and quinine is an excellent preparation, which will frequently be found very useful. The muriated tincture of iron is very serviceable in some cases.

In spermatorrhœa associated with irritability of the urethra, attended with considerable debility, Dr. Wilmot has found the most efficient remedy to be the sulphate of zinc, which, he says, "may be increased gradually, from one to five grains three times a day, without its producing any annoyance to the stomach. Where there is much nervous excitability of the system, as is generally the case when the spermatorrhœa amounts to any extent, the preparations of valerianic acid with zinc, iron, and quina will be more applicable."—*Opus cit.*

Before having recourse to tonics, it will frequently be necessary to exhibit gentle aperients, and such remedies as may be required by the deranged state of the digestive organs. The cold, or shower bath, has usually an invigorating effect when it causes no chilliness. In persons much debilitated, it will be best to commence by sponging the body every morning with tepid water, and afterwards rubbing the skin dry with a thick cotton towel. Cold water should be substituted for tepid, as soon as the former can be borne. Cold water with a little salt in it should be dashed over the genital organs once or twice a day. Opium is often of great service in cases attended with much nervous excitement. Early rising is essential in most cases of nocturnal emissions. The diet must be regulated according to the state of the digestive powers of the patient. It should be light and nutritious, such as will give power without stimulating too much. Every possible means should be adopted which are likely to invigorate the patient, amongst which, the pure air of the sea, and cold salt-water bathing, are not the least efficient.

From the mental depression which is more or less a constant accompaniment of spermatorrhœa, every effort should be made to tranquillise the mind of the sufferer, and to encourage him to look forward hopefully to his recovery. The first, and not the least essential, part of the treatment of these cases, especially in their more aggravated forms, is to gain the confidence of the patient; unless this be done, he will never be induced to persevere for a sufficient length of time in the use of the requisite remedial measures.

Nocturnal emissions are sometimes merely the result of plethora of the spermatic vessels; and if only of occasional occurrence, are of little consequence; when, however, they happen oftener than once or twice a month, attention should be paid to them. In diurnal pollutions, constipation should be prevented, and the rectum kept as free as possible from irritation. When involuntary seminal emissions are of frequent occurrence, impotence is, sooner or later, their certain result.

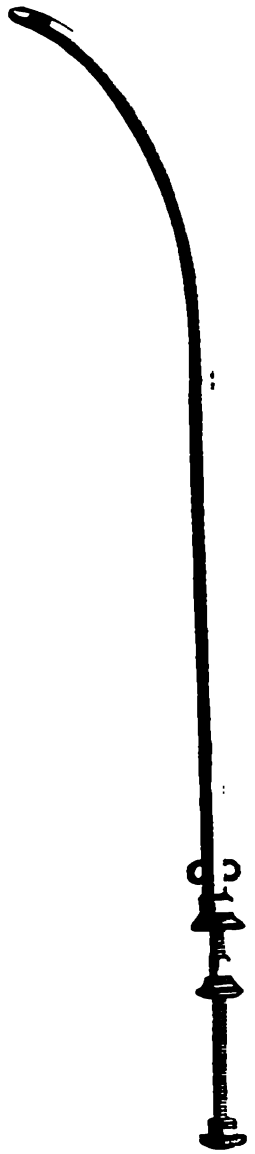
In the local treatment of spermatorrhœa no remedy has probably been so generally used as the application of the nitrate of silver to the prostatic part of the urethra. The caustic is commonly applied with the instrument designed by Lallemande, who, it is well known, entertained a high opinion of the effects of this remedy. The nitrate of silver is undoubtedly useful in some cases; whilst in others it is totally inefficient. When used, the caustic should not be allowed to remain in contact with the urethra more than two or three seconds, for if more freely applied, so much irritation ensues that commonly more harm than good is done. I have known instances in which stricture has resulted from its too free application. I believe the caustic will prove most useful in those cases in which there is either inflammation, or a highly irritable state of the posterior portion of the urethra. When there has been scarcely any pain on passing an instrument through the prostatic part of the urethra, and there is a flabby state of the canal, the spermatorrhœa appearing to depend chiefly upon atony of the seminal ducts, and on a morbid irritability of their associated organs, I have found much benefit from the occasional introduction of as large a metallic sound as could be borne without irritation. The instrument should be retained in the urethra from a quarter to half an hour. The pressure of the sound, most probably by its stimulating effect, produces a more healthy state of the orifices of the seminal ducts, which are often relaxed and patulous

in such cases; but, whatever may be its precise mode of action, the instrument, when used for some length of time, has certainly been beneficial.

I seldom now apply the nitrate of silver with Lallemande's instrument, having found that a strong solution of the salt causes less irritation, and generally proves equally efficient as when it is in its solid form. The best method of applying the solution, is by a simple and ingenious instrument invented by my colleague, Mr. Henry Smith. It will be seen by the annexed drawing that the instrument consists of a curved canula with a stylet, having a handle at one end, and at the other a silver bulb, immediately below which is attached a piece of sponge about an inch and a half long. There is a screw for regulating the distance of sponge required, and for fixing it for introduction. In the figure the sponge is seen projecting slightly at the point of the canula. (See *Medical Times and Gazette* of February 14th, 1852.)

In strictures at the bulbous portion of the urethra attended with pollutions, I have often found that a few mild applications of potassa fusa to the posterior part of the canal, by removing the inflammation and irritability of the affected tissues, have either entirely checked, or considerably diminished, the frequency of the emissions. When the introduction of an instrument causes a sharp burning pain in the prostatic portion of the urethra, one or two gentle applications of lunar caustic will sometimes prove advantageous by relieving the morbid sensibility of the seminal ducts.

Counter-irritation is often beneficial. The emetic tartar ointment rubbed into the perineum until pustulation is produced, or a blister applied to the same part, are both frequently useful. I have found a very good counter-irritant in the application of a strong tincture of iodine with the acetum cantharides, in the proportion of six parts of the former to two of the latter. It should be applied to the perineum and under surface of the penis.



MR. SMITH'S INSTRUMENT FOR APPLYING A SOLUTION OF CAUSTIC P
[illegible] SPERMATORRHŒA

CHAPTER XXIV.

GLEET.

Persons with stricture are frequently subject to a discharge from the urethra, which may be either mucous, serous, or muco-purulent. In these cases there is more or less chronic inflammation of the lining membrane of the urethra, its situation being principally immediately behind the obstruction. The membrane of the contracted portion itself is, however, often inflamed, as is sometimes, also, that just in front of the obstruction. The discharge may be so slight as scarcely to stain the linen, or merely sufficient to agglutinate together the lips of the urethral orifice; whilst, in other cases, it may be so abundant as to resemble, and be mistaken for, a gonorrhœa.

Persons with bad strictures may probably be scarcely ever entirely free from gleet; although, in general, the discharge is not constant, but occurs occasionally, being produced by whatever causes irritation of the affected parts. The discharge will, in some cases, entirely cease for weeks, or even for months; and then, from cold, venereal, or other local excitement, return as abundantly as ever. The discharge, if caused by stricture, usually subsides when the latter is cured. In addition to the introduction of the bougie, the administration of some of the internal remedies commonly employed for gleet when independent of stricture, may assist the local treatment, with the exception, however, of those which are too stimulating, such as cubebs and tincture of cantharides.

As it is the continuance of gonorrhœa in a chronic form, indicated by a thin gleety discharge, that so often induces a slight thickening of the mucous membrane of the urethra, which eventually constitutes stricture, it is, of course, always highly desirable to pay strict attention to such discharge, however slight it may be.

Gleet appears essentially to consist in chronic inflammation of

the muciparous glands and lining membrane of the urethra. The scalding sensation so painful during micturition, in the earlier stages of gonorrhœa, is seldom experienced in gleet, except from an accession of inflammation which may occasionally occur from some excess.

This disease, trivial as it may appear, has often baffled the skill of the ablest surgeons. It is in persons of weak constitution with disordered digestive organs, especially when of strumous habit, that gleet is most likely to resist the remedies employed for its suppression. It should always be borne in mind that the gleet which follows gonorrhœa is occasionally infectious; and as long as any discharge remains, the patient should be informed of the possibility of communicating disease. For two reasons especially, it is most desirable to cure a gonorrhœal gleet. These are its possibly infectious character, and its tendency to the production of stricture. The means to be adopted for its removal are general and local. The former comprise such remedies as, by their stimulating effects upon the mucous surface of the urinary organs, have proved most successful in causing a healthy action of the congested or inflamed vessels. Of these remedies, the copaiba balsam stands first in efficacy; next the cantharides; then cubebs; after which iodine, quinine, iron, sarsaparilla, and various other tonics. Each of these medicines separately employed may fail in curing the disease, when the judicious combination of some of them will often succeed. The combination of medicines of the same class is indeed often attended with very successful results. For example, I have failed in procuring sleep for a restless patient by the separate exhibition of the different preparations of opium, camphor, the extracts of henbane, hemlock, or poppy; when by the administration of half a grain or a grain of the muriate or acetate of morphia, with five grains of the extracts of poppy and henbane, the desired effect has been produced. So it is with stimulating remedies in gleet; when tried individually each will very probably fail, although the combination of some of them may prove successful.

I have found the balsam of copaiba, combined with the tinctures of cantharides and sesquichloride of iron, more generally successful in the cure of gleet, not dependent upon stricture, than any other internal remedies. If, after a fair trial, the above combination should fail, either the tincture or the powder of cubebs may be substituted for the tincture of sesquichloride of iron. These remedies must, of course, be made as little disagreeable as possible by

the addition of syrup and any aromatic water that may be most palatable to the patient.

Where there is any disposition to scrofula, very excellent effects are often experienced from a combination of the iodide of potassium, with the compound extract of sarsaparilla, the tincture of cubebs, and compound infusion of gentian. In gleet attending stricture, I generally employ the alkaline solution of copaiba, if there exist no objection to its use, in preference to such remedies as are more stimulating.

The most efficient local means are injections of nitrate of silver, of bichloride of mercury, the chloride of zinc, the sulphates of that metal, of copper, and of alum; also the acetate of lead. These injections should be used successively, as one will often succeed when another has failed. They should be employed at least three or four times daily, and retained for one or two minutes in the urethra. The occasional introduction of the bougie has also frequently an excellent effect. The pressure of the bougie appears to remove the congestion or chronic inflammation of the lining membrane of the urethra, and will sometimes prove successful when other remedies have failed. In some cases of an unusually obstinate character, where there has been no stricture, I have used with good effect a bougie besmeared with mercurial, or tolerably strong nitrate of silver, ointment. Counter-irritation in the perineal region by the application of strong tincture of iodine, frictions with emetic tartar ointment, or by the occasional application of blisters, is often beneficial. The cold bath, both local and general, more especially sea-bathing, has proved of great service.

In some instances a gleety discharge may depend upon the irritation caused by an enlarged mucous follicle of the urethra, originating in inflammation, and remaining in a state of chronic induration. These follicular tumours are sometimes very small, and cause no irritation; whilst at others, they are as large as a full-sized acorn, and may then offer an obstruction to the introduction of a bougie, as well as to the exit of the urine. The situation of these enlarged follicles is most frequently near the frænum, although they are sometimes observed lower down in the urinary canal. They occasionally suppurate, and break either externally or internally. By the former occurrence the disease will, in general, be cured, although there may remain for some length of time more or less induration of the affected part. In the latter event the cure is

usually more protracted, from the urine finding its way into the sac of the abscess. In such a case a small compress of lint, secured in its place by adhesive plaister, so as to compass the sac, may assist its contraction.

I have known these tumours to remain for many months, keeping up more or less gleety discharge, and then gradually subside without the occurrence of suppuration. The treatment which I have usually adopted for their dispersion has been by paying strict attention to the state of the digestive organs, by the external application of an ointment composed of iodide of potassium and mercurial ointment, and occasionally by painting them with the tincture of iodine. As one means of dispersing these tumours, Sir B. Brodie mentions that of "keeping the patient in bed with a gum catheter in the urethra and bladder. This plan," he tells us, "may be pursued for a few days each time, and repeated at intervals, until the tumour is nearly dispersed. The gum catheter should be of small size: a large one will produce an effect exactly contrary to what you wish, irritating the gland, and exciting a fresh attack of inflammation in it." When the abscess bursts internally, and cannot be made to heal by the application of external pressure to the sac, Sir B. Brodie advises, that "a director should be introduced into the urethra, and an incision then made so as to establish a free external opening leading to the centre of the abscess, dressing the parts afterwards with some stimulating ointment, and applying occasionally the nitrate of silver."

When gonorrhœa is associated with stricture, the use of instruments should, of course, be discontinued, until of the former there remains nothing more than a slight gleety discharge, unless retention of urine render the introduction of the catheter necessary, in which case one of gum elastic is to be preferred, as causing the least irritation. Injections should not be used until the gonorrhœal discharge has assumed its gleety form, and there remains but a slight degree of urethral irritation.

CHAPTER XXV.

HÆMORRHAGE FROM THE URETHRA.

Discharge of blood from the urethra may be the result of external injury, of the passage of calculous concretions, or of the venereal orgasm; but in cases of stricture it is generally caused by the introduction of instruments; and when the armed bougie of Sir E. Home was in common use, severe hæmorrhage sometimes followed the separation of a slough. In some instances the lining membrane at the seat of disease is so extremely vascular that a few drops, or tea-spoonfuls of blood will flow, however gently an instrument may be passed. If, in attempts to dilate a stricture, the lining membrane of the urethra be lacerated, a more free hæmorrhage may then take place, and proceed to such an extent as to alarm the patient, more particularly as blood and urine coagulating together in equal proportions, the loss of the former is often supposed to be double its real amount.

Sir Everard Home, in his Clinical Lectures delivered at St. George's Hospital, declared that he never knew hæmorrhage from the urethra to prove fatal. I have never witnessed any of those profuse discharges of blood which have been described as sometimes produced by the free use of caustic, but have occasionally known considerably hæmorrhage to result from the introduction of instruments. The most profuse sanguineous discharges proceed from the posterior part of the urethra, where the vascularity is greatest. Although these hæmorrhages are mostly the consequence of treating a stricture too roughly, they may occur when no improper force has been used, and when the introduction of the instrument which caused the bleeding has given the patient scarcely any pain. Some strictures have naturally a hæmorrhagic tendency, from their excessive vascularity; when, from the over-distension of their vessels, very gentle pressure of an instrument

may cause a slight oozing of blood. Some persons seem peculiarly predisposed to hæmorrhage from the mucous surfaces, and in such, when a discharge of blood occurs, it continues unusually long. However alarming these sanguineous discharges from the urethra may be to the patient, by the surgeon they are regarded as of little importance, from his confident reliance on the resources of surgical art for their speedy suppression.

If called to a patient with rather profuse urethral hæmorrhage, effectual means must be taken for its suppression, which can be readily effected by the application of pressure, unless it proceed from the prostatic portion of the urethra. The closed fingers should be placed as far backward as possible on the perineum, and gradually brought forward, making firm pressure on the urethra all the time, until the flow of blood from the penis ceases, which will be a proof that the bleeding vessel or vessels are compressed. Particular care must be taken that the pressure be made upon the precise spot from whence the hæmorrhage proceeds; for if made anterior to it, although no blood may escape from the penis, yet it will pass backwards into the bladder. To avoid such an occurrence, when the flow of blood ceases, it is only necessary to move the fingers a little backward until the discharge again takes place, by which means the exact situation where the pressure should be made can always be ascertained.

The introduction of a silver catheter as large as can be passed, would of course assist the effect of the perineal pressure; but as hæmorrhage from the urethra, for the most part, results from laceration, this proceeding should only be adopted in cases in which the bleeding is considerable.

It is seldom necessary to continue the pressure long. If the surgeon cannot conveniently make the pressure, he can direct an assistant to do it, or the patient himself may be taught to accomplish the matter very efficiently by making pressure with a firm compress, made with a flat narrow piece of wood or cork wrapped in lint or linen. If, as not often happens, it be impossible to command the flow of blood by pressure, then the bleeding must proceed from the posterior part of the urethra at its prostatic, or vesical, portion, when, should it have been caused by the introduction of instruments, it will in general soon cease, on the application of cloths dipped in cold vinegar and water to the perineum and over the supra-pubic region. If the hæmorrhage should be great, and not easily ·sed, pounded ice in a bladder must be

applied, and a full dose of opium, with the acetate of lead, should be administered. The acetate must be continued as long as the hæmorrhagic tendency continues; or other styptics may be tried, such as gallic acid, spirits of turpentine, the combination of alum, and full doses of diluted sulphuric acid, &c. An injection of cold water, per rectum, may also prove useful. Blood sometimes finds its way into the bladder, and there coagulates, causing much suffering. The proper practice in such a case is to inject the bladder with warm water. A double catheter is generally used. It should be moved freely about the bladder, so that the coagula may be broken before using the warm water. The water dissolves the blood, and of course facilitates its removal. Dr. Gross recommends on these occasions an injection of tepid water and acetic acid, in the proportion of one ounce of the latter to five ounces of the former, as he believes this preferable to the use of warm water alone, from the circumstance of vinegar being a powerful solvent of blood. If these measures should fail in emptying the bladder of coagulated blood, which will rarely be the case, and the symptoms of retention of urine become urgent, then the vesical cavity must be relieved of its contents by an incision through the perineum, as in the lateral operation for lithotomy; or above the pubes, the former being preferable, if there be no valid objection to its employment.

Hæmorrhage from the bladder is not a common consequence of stricture. A case, however, occurred to me some time ago, where it appeared to have indirectly resulted from that cause. I was requested to see a poor man who had considerable discharge of blood from his bladder, which he said was caused by lifting a heavy weight. Notwithstanding the use of full doses of opium, with acetate of lead, as well as the application of ice to the perineal and suprapubic regions, the hæmorrhage continued unabated, and it became evident the man would soon sink unless something more efficient was done for him. It then occurred to me that injecting the bladder with some astringent might probably succeed in stopping the flow of blood. On proceeding to inject the bladder with a solution of a drachm of alum to half a pint of water, I found a stricture at the bulb, through which a No. 3 catheter was passed with difficulty. After the first injection, scarcely any blood was passed for three days, when there was a slight return of hæmorrhage; and as the man had been much exhausted by his previous loss of blood, I repeated the injection, after which there was no return of bleeding. In this case it is most probable that the mucous membrane of the

bladder was in a state of congestion or inflammation, from the obstruction caused by the stricture to the free discharge of urine, and very probably being distended at the time of injury, some vessel or vessels were ruptured.

Urethral hæmorrhage sometimes occurs in prostatic disease from chronic inflammation or a congested state of the capillary vessels at the posterior part of the urinary canal and neck of the bladder. When the prostatic enlargement is accompanied with retention of urine, the entire vesical mucous membrane is usually more or less congested and inflamed.

Although urethral hæmorrhage is commonly either traumatic, or the result of disease of the prostatic gland, it sometimes occurs spontaneously. Some persons are constitutionally predisposed to congestion of the mucous membranes; and in these, when the general health has become impaired, either from excess or advanced age, urethral hæmorrhage is of occasional occurrence. The immediate cause of the hæmorrhage may be the jolting of a carriage, riding on horseback, sexual intercourse, or whatever brings on a distension of the vessels of the urethral mucous membrane.

These cases are usually benefited by the exhibition of tonics, such as quinine, the mineral acids, the tincture of the sesquichloride of iron, and the oil of turpentine. Injecting the urethra with cold water has proved useful, as have also cold water enemata.

Sir B. Brodie has a high opinion of Ruspini's styptic in discharges of blood from the urethra, and relates a case of frightful hæmorrhage from prostatic disease, in which, he observes, "All other remedies having failed, I gave the patient a dose of the nostrum known as Ruspini's styptic, and repeated the dose two or three times in the course of the next twelve hours. About half an hour after the first dose was taken, the hæmorrhage ceased, and it never returned."—*Opus cit.* Of all internal remedies for urethral hæmorrhage, the gallic acid has, I believe, the strongest testimony in its favour.

CHAPTER XXVI.

FALSE PASSAGES.

These are generally formed by unjustifiable violence in the use of instruments. They may be made in any part of the urethral canal, but are most frequently situated in its posterior portion. When false passages are caused by the introduction of instruments in the treatment of stricture, they are oftener observed at the bulbous than any other part of the urethra. The false channel is commonly caused by the end of the catheter, bougie, or sound, having been allowed to sink too low at the injured part; and when forcibly urged forward the urethra is ruptured; the instrument passing under, or by the side of, the membranous portion of the canal. The length of a false passage varies from a few lines to several inches; but, in general, it is not more than from half an inch to two inches in extent. Sometimes the new channel is of considerable length, running between the compressor urethræ, and superficial sphincter ani muscles, as far as, or even beyond, the neck of the bladder. In enlargement of the prostate, the usual situation of a false passage is at the membranous portion of the urethra, the artificial channel passing through a perforation of that gland into the bladder. The false passage may run so close to the urethra as to be separated from it only by the mucous membrane. In some instances, it is observed traversing for a short distance under, or by the side of, the urethra, and again re-entering the canal before it reaches the bladder. Sometimes, the false passage communicates with the rectum, and very often heals without any ill effects, although occasionally it is followed by a recto-urethral fistula.

False passages are frequently made in cases of enlarged prostate, that gland being often perforated in several places. The

artificial channel becomes lined by an adventitious membrane, and often proves an efficient substitute for the natural canal.

False passages are seldom followed by extravasation of urine. The principal reasons for its non-occurrence are doubtless those which are commonly assigned, viz., that the seat of an abnormal channel is in front of the stricture, and that its direction being obliquely backward towards the bladder, contrary to the natural course of the urine, the latter does not find a ready entrance into it. Besides, false passages are usually made very gradually, and the inflammatory lymphatic effusion resulting from the injury, would most probably effectually prevent the escape of urine.

When a false passage has been made behind the stricture in the membranous or prostatic portion of the urethra, death has sometimes ensued from extravasation of urine. In enlargement of the prostate, or other obstruction at the vesical entrance, if, when using a catheter or sound, the handle of the instrument be depressed too soon and much force be employed, the upper part of the urethral canal may be easily perforated.

It has been stated that the immediate cause of this lesion is the unskilful employment of force in the introduction of instruments. The predisposing causes are arranged by Dr. Gross under two heads, the natural and the accidental. They are described by him as follows :—"The natural causes are the mucous lacunæ, the sinus of the bulb, the margins of the triangular ligament, the sinus pocularis, and the anterior border of the prostate gland; and it is worthy of remark, that these obstacles to the easy introduction of the catheter nearly all exist along the inferior surface of the canal."

"The accidental causes predisposing to the formation of false passages, are, first, an inflamed, softened, or ulcerated state of the mucous membrane; secondly, a preternatural development of the lacunæ or mucous follicles; thirdly, the existence of a tight, narrow, semi-cartilaginous stricture; fourthly, a deviation of the urethra from its natural direction; and fifthly, the nature and form of the instrument used in our operations."—*Opus cit.*

When the lining membrane of the urethra is torn by the point of a sound or catheter, the peculiar sensation communicated to the hand cannot well be mistaken by one accustomed to the treatment of stricture. If the mucous membrane of the urethra should be lacerated, an occurrence which must have happened occasionally to every experienced surgeon, the instrument should be imme-

diately withdrawn, and the urethra left quiet until the breach of surface have time to heal. The passage through the triangular ligament is the principal difficulty experienced by those unaccustomed to the frequent introduction of instruments into the bladder ; for if the point of an instrument be not kept well to the upper part of the urethra, it is apt to sink into the sinus of the bulb, and to pass under, instead of through, that ligament, when, should much force be employed, a false channel may result.

The triangular ligament may sometimes cause obstruction in more practised hands, as was, I presume, the case in a dispensary patient of mine somewhat hypochondriacal, who was under my care with a strictured urethra, and who came to me one morning in very great alarm. As soon as his extreme agitation permitted him to use his tongue, I learned that he had been to consult another surgeon, who, after having attempted to pass a catheter, assured him that there was no possibility of getting an instrument into his bladder, and that a false passage had been made. The gentleman also showed him some plates, by which he explained geographically the precise road my instrument had taken, and at the same time assured him that the channel to his bladder was impassable. The man's story somewhat surprised me, as two or three days before I had passed a No. 11 steel sound into his bladder without the slightest difficulty. To convince him that his fears were groundless, in the presence of one of my pupils, I introduced easily a No. 11 silver catheter, and his satisfaction was no less than his astonishment when the urine flowed freely through the instrument.

In sixty-eight preparations of stricture which I examined, there were false passages in nineteen, and in two of the nineteen the false passage was observed to run for some little distance on each side of the urethra. It is commonly supposed that by far the greater number of false passages are made in the under part of the urethra. In the nineteen examples the result was as follows :—

In the under part of the urethra	10
In the upper part	2
At the side (in two of the cases two passages) .	9

Civiale considers that false passages, contrary to the opinion which is generally entertained, are situated in the upper part of the urethra; and states that in many of the cases which he had

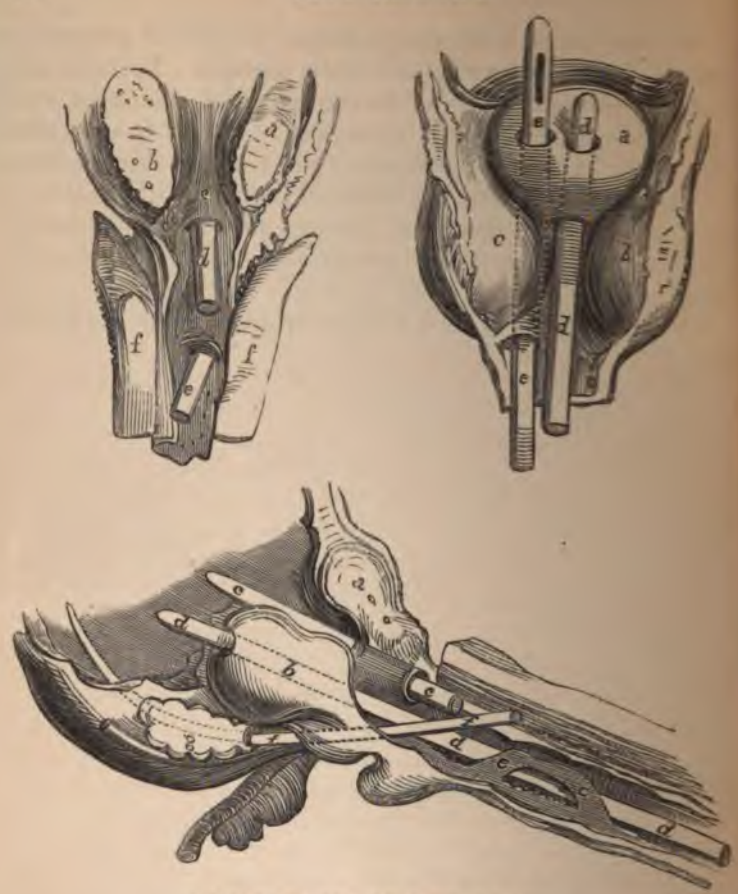
witnessed, the false passage produced by the bougie or sound existed in the superior surface of the canal.

It is, I believe, generally imagined that an instrument is never grasped in a false passage as if by a stricture. When a false passage is made below a stricture, it usually goes under the thickened tissue formed by the disease; and although it may extend to ten or twelve inches from the meatus, even as far as the vesiculæ seminales, an instrument will seldom be very firmly grasped. When, however, a false channel exists by the side of or above the urethra, an instrument will often be as firmly grasped by the tough fibro-semi-cartilaginous tissue, as by the stricture itself. The sensation communicated to the hand when an instrument has been passed into such a false passage, will often be so similar to that caused by a hard stricture, that the one can scarcely be distinguished from the other. When these false passages take nearly the natural course of the urethra, even with the aid of the introduction of the finger into the rectum, the most experienced surgeon may sometimes be confident that his instrument is in the right, when, in reality, it is in the wrong channel. These false passages can, I think, be almost always avoided, if solid curved instruments be used; but bougies, whether of plaster or elastic gum, will occasionally enter the artificial channel, notwithstanding the greatest care may have been taken to prevent them. In cases of impassable stricture, complicated with one or more false passages, and where frequent attempts have been made to pass instruments, all such attempts should be given up for some little time whilst the patient is kept as quiet as possible, and care be taken that the bowels are but little disturbed. Those medicines which best allay irritation should be administered. By these means, continued for three or four weeks, the irritation of the stricture, caused by the frequent introduction of instruments into the false passage, will often be so much diminished as to enable the surgeon to pass an instrument into the bladder, whereas, previously, that operation had been quite impracticable.

Great care should be taken in the introduction of instruments when a false passage is suspected. If an instrument passes forward suddenly with a jerk, or twists a little out of the direct course of the urethra, it has very probably entered a false channel, and should be immediately withdrawn. That these lesions of the urethra are of very frequent occurrence cannot be denied. Civiale observes, "When I visited the rich pathological collections of

London, I was struck with the prodigious number of preparations presenting all possible varieties of false passages. I mentioned to one of the principal surgeons who accompanied me the reflections suggested by such a frightful collection. 'Do not be astonished,' he replied, 'to find here more cases of false passages than elsewhere: it is only because we preserve these preparations with greater care than is done in other museums;' adding, that these misfortunes of surgical practice occurred everywhere nearly in the same proportion."

Some illustrations of false passages will be seen in the annexed Plate.



DESCRIPTION OF THE PLATE.

Figure 1.—On the left side.—"Two bougies, *d*, *e*, are seen to enter the upper wall of the urethra, *c*, anterior to the prostate, *a*, *b*. This accident happens when the handle of a rigid instrument is depressed too soon, with the object of raising its point over the enlarged lobe of the prostate."

Figure 2.—"Two instruments appear transfixing the prostate, of which body, the three lobes, *a*, *b*, *c*, are much enlarged. The instrument *d* perforates the third lobe *a*, while the instrument *e* penetrates the right lobe *c*, and the third lobe *a*. This accident occurs when instruments not possessing the proper prostatic bend are forcibly pushed forwards against the resistance at the neck of the bladder."

Figure 3.—"In this case an instrument, *d d*, after passing beneath part of the lining membrane, *e e*, anterior to the bulb, penetrates *b*, the right lobe of the prostate. A second instrument, *c c*, penetrates the left lobe. A third smaller instrument, *f f*, is seen to pass out of the urethra anterior to the prostate, and after transfixing the right vesicula seminalis external to the neck of the bladder, enters this viscus at a point behind the prostate."—"*Surgical Anatomy*." By *J. Maclise, F.R.C.S.*

CHAPTER XXVII.

PROSTATIC AND URETHRAL CALCULI.

Prostatic calculi, which are formed in the ducts of the prostate, consist almost entirely of phosphate, with a very small quantity of carbonate, of lime, and a little animal matter. They are occasional complications of stricture of the urethra. These concretions are usually of a light brown colour, varying in size from that of a pin's head to a small pea, although they are occasionally observed of much larger dimensions. When very small, more than a hundred of these prostatic calculi have been found in an individual; but generally they are few in number.

The symptoms attending prostatic concretions are commonly obscure, not being easily distinguished from those of other affections of the prostate, or from stone in the bladder; and when associated with stricture, it is very probable the attention of the surgeon will be so occupied with the latter affection that he will entirely overlook the former. When small, and not causing much enlargement of the gland, prostatic calculi have often remained undetected during life.

In many cases, however, they cause a sense of uneasiness in the neck of the bladder and perineum, with more or less difficulty in micturition; and when of sufficient size or number to cause considerable enlargement of the prostate, the cyst in which they are contained may so much encroach upon the urethra as to produce complete retention of urine. When projecting into the urethra, on the introduction of a sound, they will usually be found to grate against the instrument, especially if at the same time counter-pressure be made by the finger, introduced into the rectum. When associated with stricture, the dilatation of the latter should first be accomplished, and the surgeon's attention afterwards be directed to the prostatic disease. Sir B. Brodie gives us the result

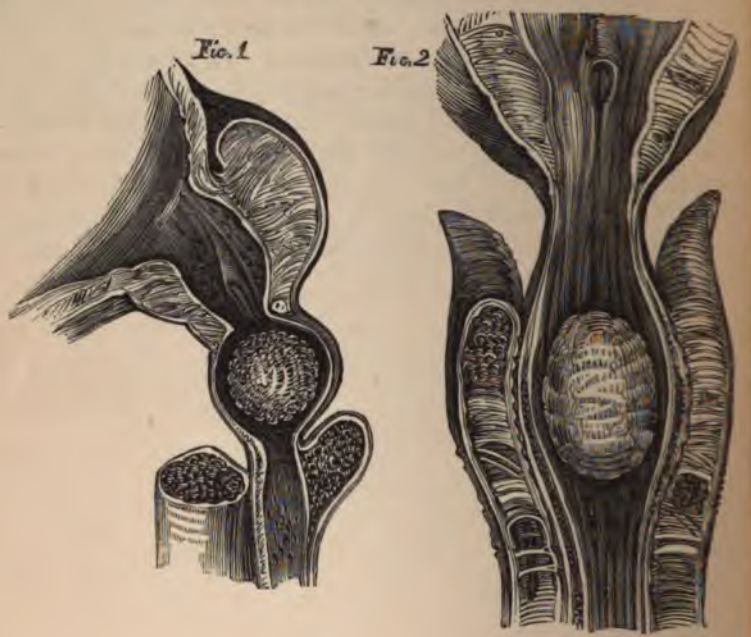
of his experience with regard to the treatment of prostatic calculi, in the following words :—"We know of no medicine that is capable of preventing the formation of this kind of calculus ; and in ordinary cases there seems to be nothing for us to do beyond the occasional introduction of a large bougie, to keep the urethra dilated, and thus favour the escape of the calculi as fast as they become disentangled from the ducts of the prostate, in which they have been generated.

"There are some cases in which a number of these calculi are collected in a cyst in the prostate gland, plainly perceptible by means of a metallic sound introduced into the urethra, and just before it enters the bladder; to be felt also from the rectum, sliding on each other under the pressure of the finger. In a case of this kind, you may introduce a staff into the urethra ; and with this for your guide, make an incision in the perineum, extending to the prostate, but not into the bladder, and thus extract the calculi. Several years ago, in a case of this kind, I succeeded in removing a large number of prostatic calculi, with the assistance of Weiss's urethra forceps. There is always danger of some of these calculi finding their way into the bladder, and thus laying the foundation of calculi of that organ. This happened in the case to which I have just referred, so that after I had completely emptied the cyst of the prostate, I had to remove a considerable number of calculi of a still larger size, but of the same chemical composition, from the cavity of the bladder."—*Opus cit.*

Besides prostatic, other small calculi formed in the kidneys or bladder may descend into the urethra, and, lodging behind a stricture, either increase the difficulty of micturition, which previously existed, or cause complete retention of urine. These calculous concretions, when long retained in the urethra, often become much increased in size from depositions formed by the earthy salts of the urine. In some instances they have thus attained considerable magnitude, when the urethra has been greatly dilated, or the foreign body has been found embedded in a cyst of condensed cellular tissue, external to the canal through which it had previously escaped by an ulcerated opening.

A calculus may be originally formed in the urethra by the deposition of the earthy salts of the urine around some foreign body, such as a piece of straw or bougie, which has either intentionally or accidentally been passed into the canal, in some part of which it has become fixed.

If, after full dilatation of the stricture, the calculus should be too large to pass with the urine, the stone must be extracted, if possible, by the urethra forceps, as it will, of course, be desirable to avoid incising the urethra, especially when the opening is required to be made in that part of the urethral passage immediately above, or anterior to, the scrotum. In an urgent case of retention of urine from a calculus which has become locked behind a tight stricture, it may be necessary either to divide the obstruction by the lancetted catheter, and then extract the concretion by the urethra forceps, or to remove it by external incision. I should prefer the former method when the obstruction is in the straight part of the urethra; and the latter, when in the curved portion of the canal.



EXPLANATION.

Figure 1.—"In this figure is represented a small calculus impacted in and dilating the membranous part of the urethra."

Figure 2.—"A calculus is here represented lodging in the urethra at the bulb. The walls of the urethra around the calculus appear thickened. Behind the obstructing body the canal has become dilated, and in front of it contracted. In some instances the calculus presents a perforation through its centre, by which the urine escapes. In others, the urine makes its exit between the calculus and the side of the urethra, which it dilates. In this latter way the foreign body becomes loosened in the canal, and gradually pushed forward as far as the meatus, within which, owing to the narrowness of this aperture, it lodges permanently. If the calculus forms a complete obstruction to the passage of the urine, and its removal cannot be effected by other means, an incision should be made to effect this object."—"*Surgical Anatomy*." *By J. Maclise, F.R.C.S.*

CHAPTER XXVIII.

IRRITABILITY OF THE URETHRA—ULCERS ON THE GLANS AND PREPUCE.

The lining membrane of the urethra possesses naturally a high degree of sensibility, and often becomes morbidly sensitive under the influence of the various exciting causes to which it is exposed. The urethra and bladder being well supplied with nerves, both from the cerebro-spinal and the organic or sympathetic systems, as might be expected, the functions of the former occasionally become disturbed in consequence of the derangement of other organs. Several of the causes of irritability of the urethra are entirely independent of any morbid change in the canal itself, the increased sensibility being either produced by its sympathy with affections of other parts, or from irritation, the result of an unhealthy state of the urine, and the different acrid secretions to which its internal surface is sometimes exposed.

From the intimate association of the genito-urinary organs, derangement of the functions of any one of their component parts is very likely to produce more or less disorder of another. The cause of an irritable urethra may be the presence of a stone in the kidneys, bladder, or ureters, producing irritation in the lining membrane of those organs, and affecting the urethra sympathetically. An ulcer may produce similar effects. A not unfrequent cause of irritability of the urethra is an acrid state of the urine, especially when it contains a large proportion of the lithates, as in persons subject to gout or to scaly eruptions, of sufficient extent materially to obstruct the natural cutaneous exhalations. Another cause of urethral irritability may be either inflammation of the lining membrane of the bladder, or enlargement of the prostate gland. The vitiated mucus secreted in chronic cystitis often proves highly irritating to the urethra.

Many of the causes of irritability of the urethra originate, however, from some derangement of structure or function of the canal itself; and of these, stricture is certainly the most common. In most cases of urethral contraction, there exists more or less morbid sensibility of the lining membrane of the canal, the irritability being usually confined to the seat of disease and its more immediate vicinity, although the entire urethral passage is sometimes morbidly sensitive. The cause of this affection may be an exalted sensibility of some part of the urethral mucous membrane, probably its membranous or prostatic portion. In such cases, I believe, the increased sensibility mostly depends upon the presence of more or less inflammation of the affected part. Gonorrhœa, especially when much protracted, is a frequent cause of irritable urethra. Several months after the occurrence of the former affection, it is not unusual for a patient to find that his urine is not passed so freely as formerly, whilst, very probably, the lips of the urethra have a slightly red, swollen appearance, and are agglutinated in the morning. He may also have a sense of heat or aching in the urethra, extending to the perineum, during, and for a short time after, micturition. The urethral irritability, in this instance, depends upon the presence of inflammation in the lining membrane of the canal; the disease is, in fact, a chronic urethritis; but it is one that I have known very frequently to be mistaken for stricture.

In this affection, although the stream of urine may be very small at the commencement of micturition, it will generally be found to enlarge considerably before its termination. As, however, the symptoms of this chronic urethritis, when the disease has long continued, very much resemble those of stricture, and are, moreover, especially apt to produce that affection, a careful urethral examination should be made. In such an examination two precautions are essential to the formation of a correct diagnosis: first, that the greatest gentleness is used, or spasm may be induced; secondly, to employ a good-sized instrument properly curved, as, if small, from its being more likely than a larger one to become arrested by the lacunæ, the folds of the urethra, the triangular ligament, or other occasional causes of obstruction, it is very probable that the true nature of the disease may be entirely mistaken. The urethra often becomes in a high degree morbidly sensitive in those who have been much addicted to masturbation. Excessive venery may have a similar effect.

The various causes of urethral irritability which have been adduced must be sufficient to show the necessity of endeavouring, if possible, to ascertain the source of irritation; and as most of them are attended with some pain and difficulty in micturition, the precise nature of the affection has often been mistaken. It will be seen that an error in diagnosis may prove of serious importance to the patient, as there can be little doubt that the continued introduction of bougies in cases of mere irritability of the urethra has not unfrequently been the cause of a permanent stricture.

It should always be recollected that an irritable urethra is usually predisposed to spasm, so that on the introduction of an instrument it will very probably be arrested or grasped at the bulb or membranous portion of the canal, although there may be no permanent obstruction. It is highly probable that a surgeon may at first mistake a spasmodic for a permanent contraction; yet no mischief can arise if a simple rule be observed, which is always to use great gentleness in the introduction of instruments, and never to persist in their use when they produce no perceptible good effects. In the morbidly sensitive urethra caused by masturbation, I have sometimes found useful the occasional introduction of bougies besmeared with an ointment containing two parts of extract of belladonna to six of lard. In cases in which the irritability is confined to a small portion of the urethra, two or three mild applications of potassa fusa will often prove beneficial, as may also the nitrate of silver ointment, as was used by Mr. Guthrie.

In the treatment of a disease dependent upon such a variety of causes, everything must depend upon the judgment of the surgeon, who will of course endeavour to ascertain the source of the irritability, and then to remove it, when within reach of his art. In all cases, however, of this affection, the strictest attention should be paid to the general health, and the state of the urine, so that it may prove as little irritating as possible to the sensitive urethral membrane. The treatment of irritable urethra, when associated with stricture, has been previously described; but this slight sketch of various other sources of irritability may probably prove useful in preventing errors in diagnosis.

ULCERS ON THE GLANS AND PREPUCE.

Amongst the consequences of stricture must not be omitted the occasional occurrence of ulcers on the glans and prepuce. The

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CHAPTER XXIX.

INFLAMMATION OF THE TESTES—ORCHITIS.

Inflammatory enlargement of these organs occasionally occurs in cases of stricture, and may be either the result of the obstruction itself, or of the treatment employed. If from the former, it is mostly chronic, the enlargement taking place very gradually, and without much pain, being sometimes complicated with hydrocele; if from the latter, the inflammation is in general more acute, the pain more severe, and the swelling more rapid. When inflammation is acute, and caused by the introduction of instruments, from a dozen to eighteen leeches should be applied to the scrotum; and afterwards warm poppy fomentations and poultices. The scrotum should be suspended, and the horizontal position, when practicable, strictly enforced. A draught should be given every four hours, containing from a quarter to half a grain of emetic tartar, two drachms of Epsom salts, and twenty drops of the wine of colchicum, in an ounce of camphor mixture. Twelve grains of Dover's powder, with two of calomel, should also be given at bed-time. The application of the leeches must be repeated in a day or two, if there should be much pain or swelling. Warm applications generally afford more relief than cold, by relaxing the tunica vaginalis, the rapid distension of which often causes much suffering. The urethra should be left undisturbed by any instrument until the subsidence of the inflammation. When the enlargement of the testis is not caused by the introduction of instruments, but results simply from the extension of inflammation along the ejaculatory ducts, and is of a chronic kind, a very different treatment must be pursued. The inflamed testis in these cases has often a scirrhous-like hardness, and the pain is seldom constant, more frequently occurring in paroxysms not usually of a severe character.

In this chronic enlargement of the testes, mercury is almost a

specific; and when the patient is fairly under its influence, seldom fails to cause absorption of the effused lymph, and the gradual restoration of the inflamed organs to their healthy state. As the inflammation has been produced by the irritation resulting from the pressure of the urine against the stricture, by proceeding in the dilatation of the obstruction, and consequently diminishing such pressure, we shall greatly assist the action of the mercury in curing the disease. The stricture should therefore be gradually and very gently dilated by the bougie or sound, as if it were uncomplicated with inflamed testis. The good effects of dilatation of a stricture, under these circumstances, I have in many cases experienced.

When the swelling is of a chronic character, the application of leeches will seldom be advantageous; but the part affected should be covered with flannel spread thickly with camphorated mercurial ointment, over which a piece of oiled silk may be placed. If, as occasionally happens, paroxysms of rather acute pain be experienced, a fourth part of extract of belladonna should be added to the mercurial ointment. If the ointment prove too irritating to the skin, some fresh lard can be mixed with it. In all cases of inflammation of the testes the scrotum should be suspended; and when practicable, unless the swelling be of the chronic kind, a recumbent position is to be enjoined. Compression of the inflamed organs by straps of adhesive plaister has been strongly recommended in these cases; but having seen much irritation ensue from the practice, I am no advocate for its adoption.

CHAPTER XXX.

CHORDEE—HYPERTROPHY OF THE PENIS.

This affection, most frequently observed in gonorrhœa, occasionally occurs in stricture, and is caused by an effusion of lymph into the cells of some part of the corpus spongiosum, by which they become agglutinated, so as to prevent the free ingress of blood; the consequence is, that the penis during erection may be bent downwards, upwards, or on either side, the particular direction depending upon the situation of the lymphatic effusion. There is often considerable induration of some portion of the urethral tube, which can usually be felt distinctly by the finger. Chordee, when resulting from stricture, is produced by the inflammation at the seat of disease, extending from the urethra to the corpus spongiosum. Mr. Guthrie considered that chordee itself may be the cause of a very troublesome form of stricture, in which "the hardness is something like a cord, and occasionally like a small hazel nut." Mr. Guthrie observes, "This kind of disease is very apt to form when the urethra is ruptured, during the severity of what is termed a chordee. It yields to the distending power of the two erectile bodies, and the inflamed part is torn; the tear extends into the spongy body itself; the blood flows freely from the orifice of the urethra, and the cells of the corpus spongiosum around the rupture become loaded with it. Inflammation follows, and, without great care be taken in the treatment, a permanent stricture is the result." Unless of a gristly hardness, the thickened tissue usually becomes gradually absorbed, as the stricture becomes dilated. A little camphorated mercurial ointment, with a small quantity of iodide of potassium, rubbed gently over the affected part every night, may assist in promoting absorption of the indurated part.

HYPERTROPHY, OR ENLARGEMENT OF THE PENIS.

In some cases of stricture, where there has long been considerable difficulty in micturition, the penis becomes more or less enlarged, being longer and thicker than natural, apparently from a generally congested state of its blood-vessels. The prepuce in these cases is frequently œdematous. The hypertrophy is supposed to be caused by the habit which the patient acquires of pulling and elongating the penis, to assist in the expulsion of urine. I had a gentleman under my care who suffered from stricture for twenty years, and whose penis when he first came to me was, according to his account, full one-third larger than natural, having a distorted appearance. In addition to the general enlargement, there was considerable thickening and hardness to be felt in the under part of the urethra at the bulb, caused by the extension of inflammation of the urethra to its external tissues. In these cases, the enlargement of the penis gradually subsides as the urine finds a free passage; and in the instance just mentioned, the organ had nearly resumed its natural appearance by the time the stricture was sufficiently dilated to admit a No. 11 bougie.

CHAPTER XXXI.

ON THE LIABILITY OF STRICTURE PATIENTS TO A RECURRENCE OF THEIR DISEASE.

If there be one particular fact more than another upon which writers on stricture and surgeons in general agree, it is that those who have been affected with this disease, especially in its more aggravated form, are extremely liable to its recurrence. That although a stricture be fully dilated to the normal size of the urethra, yet, unless the use of the bougie be regularly continued for some length of time afterwards, the disease, except it be of short duration, will be likely to return. It may be as well to inquire upon what this unfortunate disposition to recurrence depends. Is the fault in the remedy, in any defect in its application, or in the natural tendency of the disease?

To use the bougie successfully, it is very desirable to understand, as far as possible, the precise manner in which it acts; and it will be useful to bear constantly in mind, that its action is of two very different kinds, the one mechanical, the other vital. The former, like the wedge, produces its effect by its distending power; the latter, by stimulating the absorbents to remove the thickened tissue, the essential part of the disease. It is possible that, by the mechanical action of the bougie, a stricture may be fully dilated to the natural size of the urethra, and beyond this it is injurious to carry the dilatation; whilst, at the same time, the greater part of the disease itself, or that which is capable of reproducing the contraction, may still remain. The narrow way may have been made wide, and thus one great object gained in having procured a free passage for the urine, and consequently the removal of no inconsiderable source of urethral irritation. Yet there will be still much left to accomplish before the disease is cured. Until the thickened tissue be removed, the bougie will indeed have but

half done its duty; and it is only by its continued use that we can hope for final success. There is surely no difficulty in comprehending why it is that strictures slowly dilated are less likely to return than when dilatation is more quickly accomplished. We cannot be much surprised at the almost certain return of strictures treated by retention of the catheter, when dilatation is usually effected in three or four weeks' time; more especially as, when thus treated, there is an additional reason for the recurrence of the contraction,—that is, the injury done, more or less, to the urethral mucous membrane and adjacent parts, by long-continued retention of instruments, which, when withdrawn, leave an irritable inflamed surface, exposed to the passage of the urine, the pain during micturition being frequently so severe as to be compared by patients to the application of a hot iron. Of course, whilst the catheter is retained, the urethra is in a great degree protected from that source of irritation. In the treatment by retention of the catheter, the stricture being generally merely stretched, will contract again on removal of the distending power, as by far the greater part of the disease remains. In many cases thus treated, so quickly indeed does recontraction take place, especially if dilatation have been rapidly effected, that on the following day after the removal of a full-sized catheter, it will often be impossible to pass one of half the size.

The lesson to be learned from these observations is this; that our treatment, to be successful, must not be confined to the mere dilatation of a stricture, but extended to the removal of the diseased tissue. How is the latter object best to be accomplished by the bougie? In the first place, the dilatation should be very gradually effected, bearing in mind that the vital action of the bougie is not its least valuable quality, to secure which it is especially desirable to avoid over-distension of the diseased tissues, absorption being best effected by a gentle pressure of the instrument. It appears to me that the most common cause of the return of a stricture is, that the thickened tissue, the essential part of the disease, has not been entirely removed. Another cause of a recurrence of the disease, but less frequent than the one just mentioned, is the existence of chronic inflammation, congestion, or perhaps mere morbid sensibility of the lining membrane at the seat of stricture, which often remains long after full dilatation has been accomplished. A patient, therefore, should never be considered cured, whilst, on the introduction of instruments, the portion of the urethra in which

the obstruction had existed either feels harder than natural, or should the bougie when passing over that part cause much uneasiness. Persons under the latter circumstances are often liable to a gleety discharge on taking cold, or from indulging in any excess. In this state I have often seen much benefit derived from the occasional introduction of a bougie, well smeared with mercurial ointment. It is best to begin with the ointment in the proportion of one part to three of lard, and gradually increase its strength. In some old chronic cases, I have, however, at once used the strong mercurial ointment, with no other inconvenience than that of sometimes a rather severe smarting sensation of brief duration. It is very probable that the mercurial application may also have had some effect in promoting absorption of any remaining hardness, as well as in relieving irritation and inflammation. I am confident that this treatment, under the circumstances just mentioned, has succeeded in removing a disposition to gleety discharge when other means have failed. Mr. Guthrie, in his work "On the Anatomy and Diseases of the Urinary and Sexual Organs," has recommended the application of his nitrate of silver ointment, composed of ten grains of the salt, one drachm of ung. cetacei, and fifteen minims of the liquor. plumbi diacetatis, to irritable spots in the urethra. When desirous of confining the application of the mercurial ointment to any particular part of the urethra, I use a common gum catheter, with a piece of thread round the stylet at its end, so as to fill up the instrument. The ointment is then inserted in the hole in the side of the catheter, the stylet, of course, having been withdrawn, and kept beyond that part until the seat of disease is reached, when the stylet must be pushed home. This is undoubtedly the best method of using Mr. Guthrie's ointment to irritable spots of the urethra.

When employing the mercurial ointment for the relief of irritation or inflammation, or to promote absorption, I generally use the common bougie, for obvious reasons. In cases of highly irritable urethræ, so frequently resulting from self-abuse, whether there may have been stricture or not, I have seen considerable improvement effected by an occasional introduction of a bougie covered with an ointment of one part of extract of belladonna to seven of lard. It has been previously stated that strictures treated by the potassa fusa were less likely to return than when the bougie only had been used. To secure so desirable an object, however, the application of the caustic potash must be continued until as much of the thickened

tissue be removed, as can be safely effected. In cases in which the stricture is of considerable extent, and of a cartilaginous hardness, although the regular and long-continued use of the bougie will commonly, in a great measure, do away with the tendency to re-contraction, yet, in many instances, the use of the instrument cannot safely be discontinued during the entire life-time of the patient. I should, indeed, strongly advise persons who have had bad strictures always to be on the safe side, and not to be satisfied without the occasional introduction of a bougie, if only to assure themselves of their continued immunity from the disease. This is, however, a subject so all-important to those who have suffered from this most troublesome, and, when neglected, often fatal malady, that, to enforce the advice just given, I shall conclude this chapter by quoting the opinions of two illustrious surgeons, of unrivalled skill and experience; the one long the boast of France; the other, the first of English surgeons.

Dupuytren, when concluding his clinical lectures on the treatment of strictures of the urethra, observed: "That whatever care may be taken in the dilatation of strictures, the dilatation is but temporary in the greatest number of persons, and the contraction has always a tendency to return. This tendency to return has induced me to cause a bougie to be passed every ten, fifteen, or twenty days." Sir B. Brodie, in one of his clinical lectures on stricture, has given us the result of his great experience on this subject in the following words:—"After a patient has conceived himself to be cured, and every symptom of the disease vanished, it is not an uncommon thing for him to suffer a relapse, and in all probability a relapse of far greater danger than the previous attack. From what does this arise? From his not continuing, at regular intervals, to pass the instrument, notwithstanding the disease should seem to have disappeared. It is the neglecting to do this which occasions so many obstinate cases of stricture. To pass it once in two or three weeks is enough, but it must never be thrown aside as useless during the life of the patient, if he desire to be freed from his troublesome affection."

CONCLUDING REMARKS.

It has been my anxious desire in this Treatise to give a faithful and unbiassed description of the various modes adopted by surgeons in the treatment of urethral stricture.

And it has been especially my study to avoid advocating any particular method of treatment exclusively,—each one has undoubtedly proved more or less successful in the hands of different surgeons. It is unreasonable to suppose that the surgeon who resorts to one mode of treatment in all forms of urethral obstruction, will meet with the same degree of success as he who, having a variety of resources at command, is enabled to select that which is most suitable to the case under his care. The real difficulty is in the selection of the one from which the patient will probably derive the greatest benefit.

The deductions to be drawn from my remarks on the different modes of treatment adopted for the relief or cure of urethral stricture may be thus briefly expressed :—

1. That simple dilatation is the method which should commonly be practised, and that, in the great majority of cases, it will succeed in affording satisfactory and permanent relief.

2. That there are numerous cases in which the relief obtained by this method will be neither sufficient nor permanent; and in these the patient must depend for any considerable improvement in his condition, either on the application of caustic to his stricture, or on its division by some cutting instrument.

3. That internal section, when practised anterior to the bulb, is attended with very little risk; but when resorted to for obstructions at the urethral curve, it has not unfrequently produced unfortunate results.

That external division, whether performed, according to the old method, in impermeable, or that of Mr. Syme, in "permeable," strictures, from its disastrous effects is an operation which can be justifiable only in the most urgent cases.

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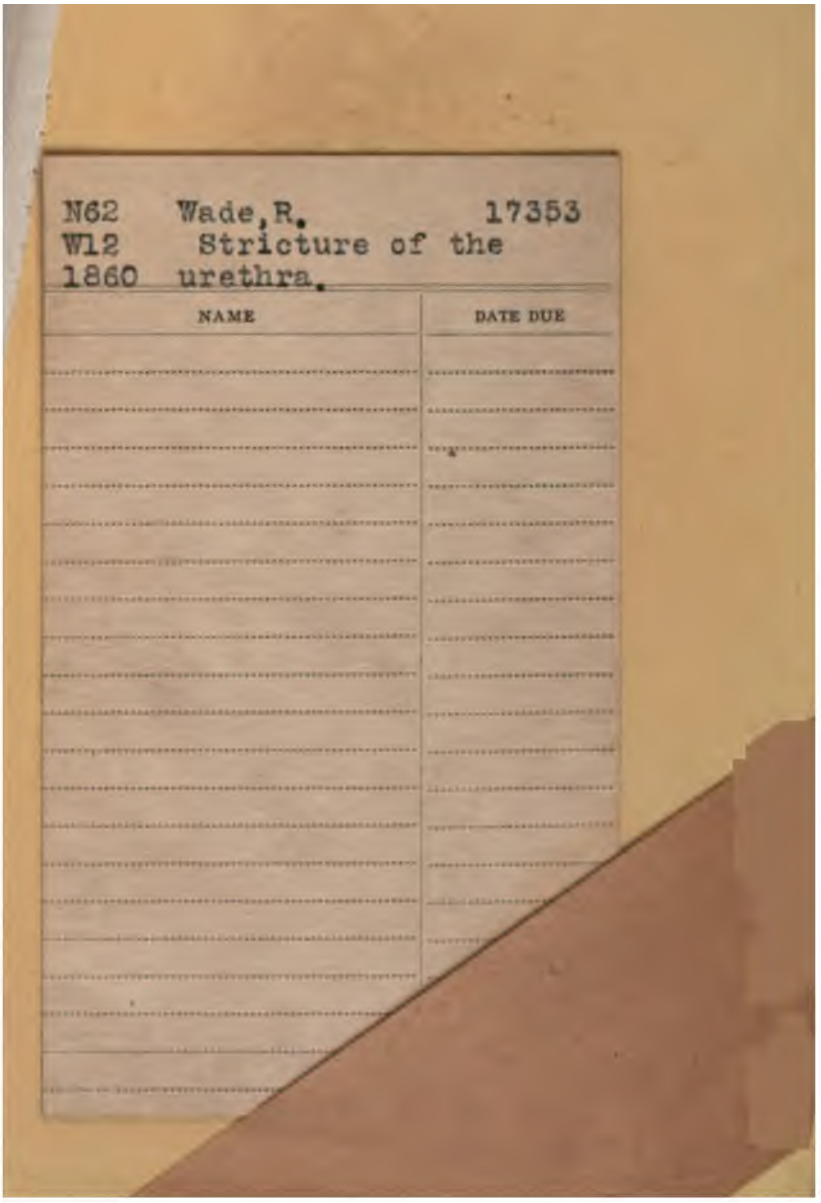

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